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AMERICAN VETERINARY MEDICAL ASSOCIATION

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Volume CXVII NOVEMBER 1950 Number 884

The Century's Third Ten Years

II. When Death Losses Threatened Livestock Farming

The National Live Stock Loss Prevention Board, U.S. Bureau of Animal Industry, Chicago Livestock Exchange, University of Nebraska, and other authoritative sources confirm personal memories to the effect that the threshold of the 1920's was characterized by an alarming animal disease situation.

Tuberculous cattle and hogs, alone, doubled during the preceding ten years; swine diseases were showing their sharpest teeth; abortions were baffling; worm parasites took heavy tolls; and all of that in the face of the all-time low enrollment of students and veterinarians deserting the profession to seek revenue in extracurricular fields.

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(To be continued)

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1. Ryff and Associates: J.A.V.M.A. September, 1949.
2. United Press Dispatch, Austin, Minn., April 6, 1950.

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AVMA ☆ Report

Veterinary Medical Activities

◆ The AVMA offices have recently been moved from the eighth to the fifteenth floor of the Fairbanks-Morse Building. The address remains the same—600 S. Michigan Ave., Chicago 5, Ill. The move was made to provide badly needed additional space. The new quarters provide a library-conference room suitable for meetings of the Executive Board and other groups of 20 or less.

The various committees and councils of the Association which occasionally hold meetings in Chicago can now hold their sessions in this conference room.

Committee chairmen are requested to advise the AVMA office of any meetings they would like to hold at Association headquarters, so that the space can be reserved for them without conflicting with other groups.

★ ★ ★

◆ President W. M. Coffee attended meetings of the Canadian V.M.A. at Montreal (Sept. 7-9); the Northeastern Mississippi V.M.A. at Corinth (Sept. 12); the Southeast Missouri V.M.A. at Hayti (Sept. 20); the South Dakota V.M.A. in Sioux Falls (Oct. 12-13); the Eastern Iowa V.M.A. at Cedar Rapids (Oct. 19-20); and the Illinois Veterinary Conference and Extension Short Course at Urbana (Oct. 25-26).

★ ★ ★

◆ Members of the Research Fund-Raising Committee met in Chicago on October 14 to organize their activities for the coming year. Those present included Dr. C. P. Zepp, Sr., chairman, and Drs. C. W. Bower, W. G. Brock, James Farquharson, A. H. Quin, C. F. Schlotthauer. The Board of Governors (Drs. W. G. Brock, W. M. Coffee, and J. R. Wells) met with the committee and then held their usual autumn meeting on October 15.

★ ★ ★

◆ President-Elect John R. Wells attended the meeting of the New England V.M.A. at New London, Conn., on October 11 and 12.

★ ★ ★

◆ Dr. Peter G. MacKintosh attended the Northwestern States Brucellosis Conference at Boise, Idaho (Sept. 7-8), as the representative of the AVMA and its special committee on Practitioner Participation in Brucellosis Eradication.

★ ★ ★

◆ Dr. John L. McAuliff, Cortland, N. Y., represented the AVMA before the International Association of Milk and Food Sanitarians at Atlantic City, N. J. (Oct. 13-16) and discussed brucellosis control in dairy cattle.

★ ★ ★

◆ Executive Secretary J. G. Hardenbergh was on the program of the Annual Short Course of the University of Missouri at Columbia (Oct. 16-17), and also addressed the student chapter while on the campus.

★ ★ ★

◆ The "Proceedings Book", which includes the meetings of the House of Representatives, the Section Meetings, committee reports, and all of the scientific papers presented at the Miami Beach convention, is being prepared by the AVMA editorial department, and will be sent to members free of charge when completed.

★ ★ ★

◆ Assistant Executive Secretary C. D. Van Houweling spoke before the following groups: Kansas State Student Chapter at Manhattan (Sept. 26); Colorado A. & M. Student Chapter at Fort Collins (Sept. 27); Colorado V.M.A. at Denver (Sept. 28-30); Iowa State Student Chapter at Ames (Oct. 2); Purdue Annual Short Course for Veterinarians at Lafayette, Ind. (Oct. 4-6); West Virginia V.M.A. at Clarksburg (Oct. 9); and Ohio State Student Chapter at Columbus (Oct. 11).

★ ★ ★

◆ Editor-in-Chief R. C. Klussendorf represented the AVMA at the meeting of the National Brucellosis Committee in Chicago (Sept. 15); The National Meat Institute at Chicago (Sept. 29-Oct. 3); and the Northeastern Wisconsin V.M.A. at Green Bay (Oct. 18).

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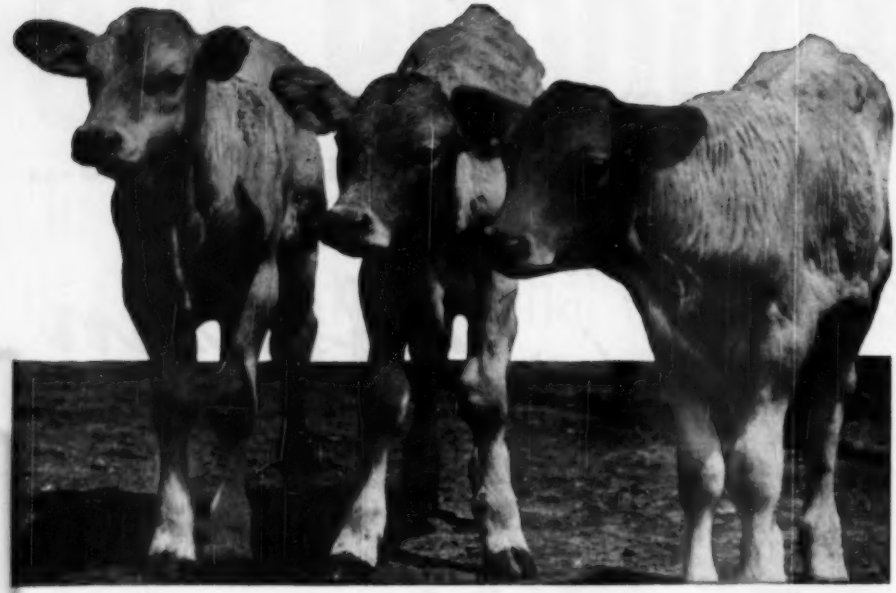

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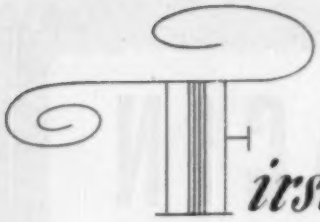

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1. Westcott, F. H.: New York State J. M., 50:698 (Mar. 15) 1950.
2. Serling, M. E.: Control of Body and Breath Odors with Chlorophyll Fractions, Vet. Med., Vol. XLV, No. 7, July 1950.

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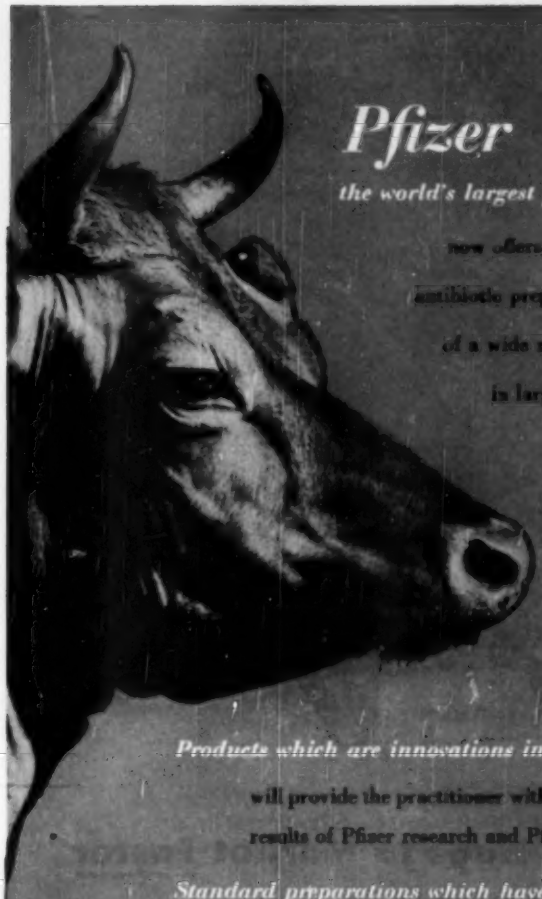

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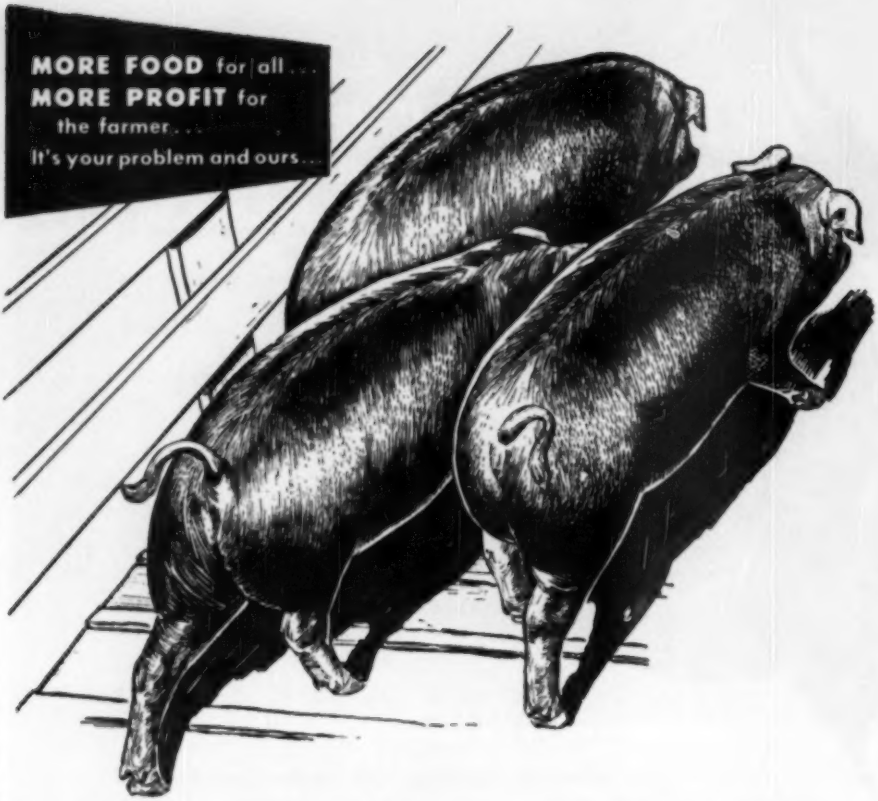

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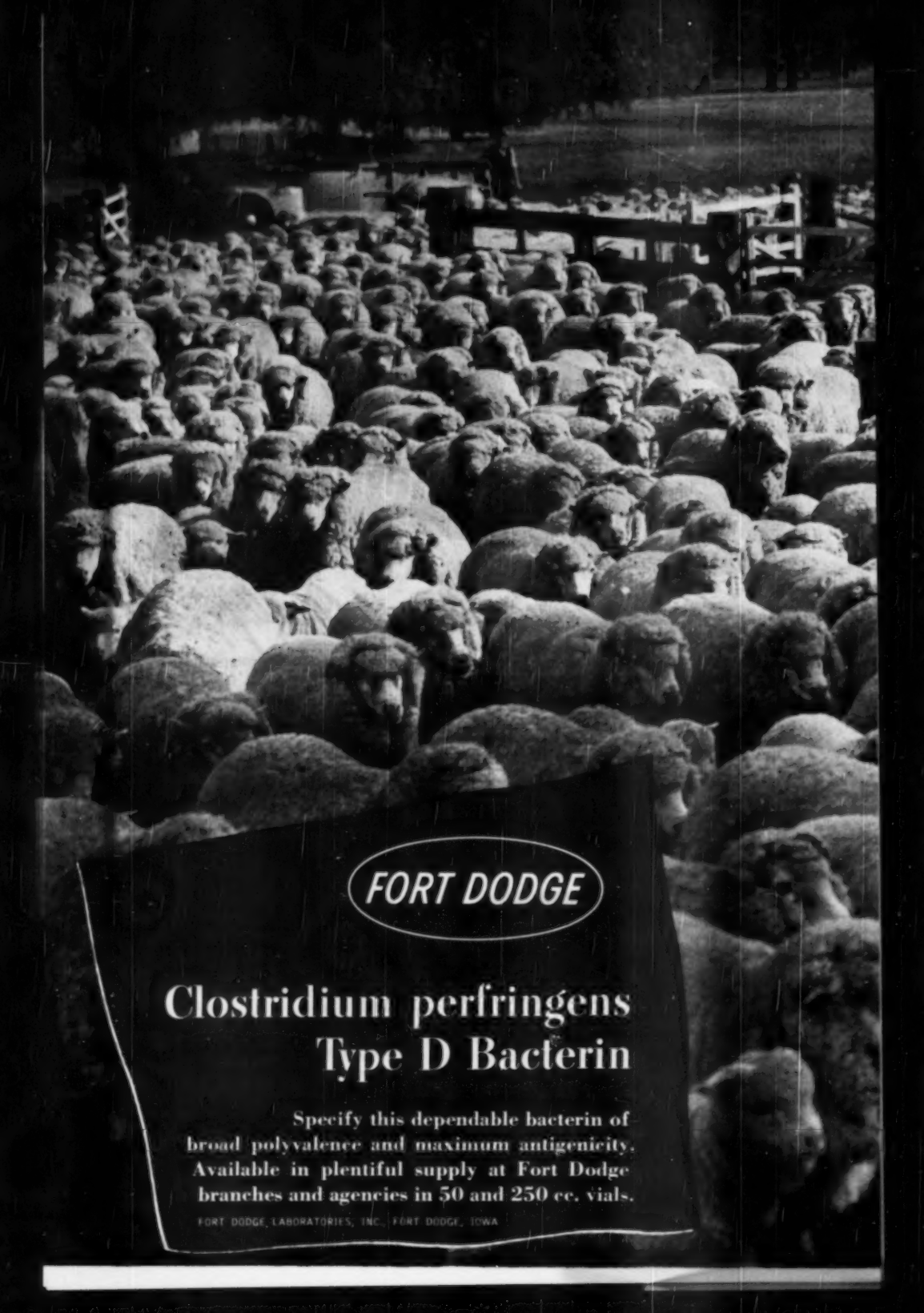
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Neoarsphenamine in Acute Eperythrozoonosis of Swine

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Manhattan, Kansas

RECENTLY, *Eperythrozoön suis* has been incriminated as the etiologic agent of ictero-anemia or anaplasmosis-like disease of swine.[1,2] The reproduction of the disease in experimental swine by Splitter[2] has made it possible to evaluate certain chemotherapeutic agents which might be used effectively in this condition. A review of the literature has indicated that specific, therapeutic action could be expected against the blood parasite causing this disease.

LITERATURE

The close phylogenic relationship of Eperythrozoon to Bartonella has been recognized.[3,4] Because of this similarity, drugs having a beneficial action in bartonellosis have been used in Eperythrozoon infections.

Neitz[5] has reviewed the literature of experimental chemotherapy of bartonellosis and eperythrozoönosis. Organic arsenicals and antimony-arsenic compounds have been highly effective in the treatment of these infections. Some of the drugs which have been found to exert a specific action against these blood parasites are neoarsphenamine, tryparsamide, sulfarsenol, arsalyt, atoxyl, spirocid, stibosan, and compound Sdt 386B. Neitz[5,7] obtained specific action against *Eperythrozoon ovis* with neoarsphenamine and Sdt 386B, and against *Eperythrozoon wenyoni* with neoarsphenamine. Heavy infections of *E. ovis* were eliminated completely from the blood in as little as fifteen minutes following drug administration. Sdt 386B showed considerably greater parasiticidal action than did neoarsphenamine.

In the past, the treatment of ictero-anemia of swine has largely been symptomatic. Robb[8] and others recommended various hemapoietic drugs to alleviate the acute anemic condition. Doyle[9] suggested that neoarsphenamine might be of value in this disease.

METHODS

The experimental chemotherapy of acute eperythrozoönosis of swine was conducted with neoarsphenamine because of the general availability of this drug. All studies were made upon acute infections of *E. suis* in splenectomized swine weighing from 45 to 125 lb.

Daily observations of the temperature, symptoms, and laboratory examinations were made throughout the course of study. Erythrocyte and leucocyte counts, hemoglobin values, and packed cell volumes were determined by standard laboratory procedures. Blood films were stained with Giemsa stain and examined to determine the degree of parasitic infection. The arbitrary method of designating the severity of infection, as used herein, is the same as that noted in a previous paper.[1]

Injections of neoarsphenamine were made intravenously into the anterior vena cava. Blood samples for laboratory examination were also obtained from this site. Considerable care was taken in making injections to keep the needle within the vein. No untoward effects were observed from repeated daily punctures of the vein or from administration of the drug at this site. Those cases examined postmortem revealed only a slight amount of hemorrhagic infiltration into the tissues surrounding the anterior vena cava. The neoarsphenamine and sodium cacodylate used in these experiments were purchased at a local veterinary supply house.

RESULTS

The detailed effects of various dosages upon heavy infections of *E. suis* are shown

Contribution No. 112, School of Veterinary Medicine, Kansas State College, Manhattan.

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in table 1. Specific action was obtained in single, intravenous injections varying from 15 to 45 mg. per kilogram of body weight, quicker action being obtained with the larger doses. Parasites were removed completely from the blood or reduced to nonpathogenic numbers in two to twenty-four hours following initial therapeutic doses. Blood destruction was halted almost immediately, in most cases, by the removal of Eperythrozoon organisms.

Most parasitic attacks were treated within twenty-four to seventy-two hours after the animals had exhibited symptoms. Two animals treated prior to showing symptoms did not develop visible evidence of the disease. The clinical condition and body temperatures of all animals returned to normal within twenty-four hours following effective therapeutic doses. Some weakness remained in those individuals in which blood values were considerably lowered by delayed treatment.

Spontaneous, parasitic relapses occurred in nearly all of these splenectomized animals and were usually re-treated with neoarsphenamine. An increased resistance to repeated treatment was evidenced by *E. suis*, in 2 of the animals (pigs 73 and 67). In pig 73, a marked resistance was developed following an initial dose of 5 mg. per kilogram of body weight, which temporarily reduced the number of parasites. In two subsequent attacks, single therapeutic doses had no effect and additional injections were required to produce action.

Neoarsphenamine therapy may have resulted in complete sterilization of Eperythrozoon in 1 animal (pig 1). This pig remained negative for thirty-one days following effective therapy. *Eperythrozoon suis* reappeared two days following injection of known carrier blood. Repeated relapses of varying severity then occurred over a period of two months, until the animal was slaughtered. In pig 2, arsenical therapy apparently aggravated a chronic, vegetative, valvular endocarditis due to *Erysipelothrix rhusiopathiae*. The animal developed symptoms following therapy with neoarsphenamine, and died thirteen days later. *Eperythrozoon suis* remained absent from the blood during this period.

In pig 60, sodium cacodylate was injected intravenously at a rate of 0.3 gr. per pound of body weight. The parasites increased rather than decreased during the following seventy-two hours. The infection was controlled immediately with neoarsphenamine.

TABLE 1—The Results of Single, Intravenous Doses of Neoarsphenamine upon Pigs Undergoing Acute Parasitic Attacks with Eperythrozoon Suis

Pig (No.)	Parasitic attack	Dosage*	Degree of Eperythrozoon infection					r.b.c. reduced**		Parasitic relapse in days
			Before injection	After injection				from	to	
				1 hr.	2 hr.	6 hr.	24 hr.			
72	1st	45	Very numerous	Rare	Neg.	Neg.	Neg.	4.98	4.68	11
	2nd	Untreated	.....	.....	.....	.....	.....	4.84	1.02	Died
1	1st	40	Very numerous	Numerous	Scarce	Rare	Neg.	6.75	5.65	None
67	1st	30	Very numerous	Numerous	Numerous	Rare	Rare	3.68	3.10	5
	2nd	15	Numerous	Numerous	Numerous	Numerous	Frequent	4.03	1.20	8
	3rd	Untreated	.....	.....	.....	.....	.....	2.18	1.25	...
2	1st	20	Very numerous	Very numerous	Very numerous	Very numerous	Scarce	4.56	2.80	None
60	1st	15	Very numerous	Occasional	Scarce	Rare	Neg.	3.66	3.88	6
	2nd	12.5	Numerous	Frequent	Occasional	Scarce	Rare	3.55	2.80	3
	3rd	Untreated	.....	.....	.....	.....	.....	3.64	2.44	27
	4th	15	Numerous	Numerous	Frequent	Occasional	Rare	2.86	3.58	...
73	1st	5	Very numerous	Very numerous	Very numerous	Very numerous	Numerous	4.72	4.04	4
	2nd	25	Extrem. numerous	Extrem. numerous	Extrem. numerous	Extrem. numerous	Extrem. numerous	3.28	.....	...
		25	Extrem. numerous	Extrem. numerous	Extrem. numerous	Very numerous	Rare	.....	1.99	5
	3rd	30	Extrem. numerous	Extrem. numerous	Extrem. numerous	Extrem. numerous	Very numerous	2.75	.....	...
		20	Very numerous	Numerous	Occasional	Scarce	Neg.	.....	1.79	5
	4th	Untreated	.....	.....	.....	.....	.....	3.08	0.68	Died

Four pigs served as untreated controls; 2 died in the initial parasitic attack, 2 underwent repeated relapses, with each acute attack producing a severe ictero-anemia.

*Dosage expressed in milligrams per kilograms of body weight.
**Erythrocytes expressed in millions of cells per cubic millimeter. Figures indicate the count at the beginning of treatment, and the lowest count observed following therapy.

DISCUSSION

These experiments indicate that neoarsphenamine and probably other Eperythrozoon-specific drugs should be valuable in the treatment of field cases of acute eperythrozoönosis of swine. It is not expected that severe, spontaneous attacks will recur following specific therapy of unoperated swine; however, such determination can be made only by the treatment of field cases.

It is evident that early treatment is necessary to secure beneficial results in field cases. Specific, parasiticidal therapy will be of little or no value if delayed until spontaneous reduction of the parasites and severe blood damage have occurred.

In acute eperythrozoönosis of swine, as in bovine anaplasmosis, many of the clinical cases are seen by practicing veterinarians only during the acute anemic stage. The swine disease differs from anaplasmosis, however, in that marked symptoms may be present at the peak of parasitic infection before severe blood destruction has occurred. Prompt diagnosis and therapy at this point can be expected to produce rapid recovery. It has been found, in both field and experimental cases, that the body temperature is a rather reliable indicator of the degree of parasitic infection. Specific therapy is indicated during the period of increased temperature, when the parasites are most frequent, while later in the disease, when the parasites have nearly disappeared and temperature returned to normal, specific therapy can be expected to show little or no value.

The characteristic morbidity of this disease, in which only 1 or 2 animals in the herd may be visibly affected, makes an early diagnosis in these cases virtually impossible without microscopic blood examination. The early clinical symptoms of depression, anorexia, and fever are identical to other acute, febrile diseases of swine, and can not be used alone to arrive at an accurate diagnosis. Specific therapy should be of value, however, in those herds in which a diagnosis has already been made in other individuals in the group.

SUMMARY

1) Specific therapy of acute, experimental infections of *Eperythrozoon suis* was obtained with neoarsphenamine. Single, intravenous doses varying from 15 to 45 mg. per kilogram (0.68 to 2.0 Gm./100 lb. of body weight) were effective.

2) Treatment must be administered early in the disease if the prevention of acute anemia is to be expected. The body temperature may be used as an indicator of the probable outcome of specific therapy in known infected animals.

3) Sodium cacodylate was ineffective against *E. suis* at an intravenous dose of 0.3 gr. per pound of body weight.

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The Private Practitioner

The private practitioner of veterinary medicine is held responsible for keeping livestock healthy. He has earned and is keeping the confidence of the animal owner who has placed this responsibility on him. —*J. T. Schwab, D.V.M., Wisconsin.*

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World Public Health Problems

W. T. S. THORP, D.V.M., M.S.

Bethesda, Maryland

THE OBJECT of international veterinary congresses is the advancement of veterinary medicine. Discussions are arranged on the most important scientific and practical questions of the day, with a view to their solution by an interchange of opinions, research findings, and experiences. The prospect that population growth might outstrip food production is a definite possibility, and a problem of great concern to the United Nations. For this reason, the general theme of the Fourteenth International Veterinary Congress was associated with the world food situation and matters relative to producing foodstuffs of animal origin.

The ensuing presentations and discussions centered on this general theme, and dealt with a number of problems having veterinary public health application. These included salmonellosis, quarantine on animal products, rabies, tuberculosis, and certain parasitic infections. The congress was opened by Lord Boyd Orr who discussed the world food situation. He recently received the Nobel Peace Prize for 1949 for his work as head of the United Nations Food and Agriculture Organization.

QUARANTINE

The importance of modern quarantine on import and export of animals and animal products as a means of ensuring a larger usable quantity of animal foodstuffs was emphasized by representatives from Australia, Sweden, and England. The reports indicated widespread breakdown of quarantine procedures during World War II. In a country such as Australia, such a weakening of quarantine procedures is of utmost importance since it is a land in which diseases like trichinosis, cysticercosis of swine, and tularemia do not exist. Moreover, foot-and-mouth disease, rinderpest, fowlpest, Newcastle disease, and hog cholera are not present.

The widespread displacement of persons and livestock when veterinary control measures had been suspended facilitated the spread of contagious diseases in many areas throughout the world. During the last two generations, for example, the geographic isolation of the Scandinavian countries enabled them to prevent epizoötics by rigorous control measures. But Christenson of Sweden reported that Salmonella infections were increasing as a result of relaxed quarantine measures during the war. It was likewise reported that certain feedstuffs and poultry products imported during the war under inadequate control had increased hog cholera and paratyphoid in Sweden. As a result, the number of paratyphoid patients had increased from 345 before the war to a present rate of 700 cases per year. The Swedish representatives, therefore, stressed the necessity for both uniformity in rules of import and export, and better means of reporting outbreaks of contagious human and animal diseases in the various countries.

The necessity for better reporting of outbreaks of contagious diseases in all countries was stressed further by representatives from numerous countries. There was a definite opinion that more adequate reporting of contagious animal diseases should take place within and between countries. Increased world trade in animals and animal products transforms questions in veterinary medicine dealing with animal diseases into far-reaching international problems calling for an increased study of the methods of international control of animal diseases.

MEAT INSPECTION

Domestic measures as well as international quarantine problems were discussed. The Danish workers, Jepson and Roth, reported on the epizoötiology of *Cysticercus bovis*, the resistance of the eggs of *Taenia*

A report on world public health problems discussed at the Fourteenth International Veterinary Congress, London, England. Presented at the Conference on Veterinary Public Health, American Public Health Association meeting, Oct. 24, 1949.

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saginata, and pointed out the increased spread of an animal, and subsequent human. disease following the breakdown of usual meat-inspection methods. The incidence of *C. bovis* in Danish cattle increased slowly but steadily after World War I, particularly in certain districts of northern Denmark which were formerly under German administration but were returned to the Danish government. The incidence of this disease increased much more rapidly, however, during and after the German occupation in World War II, because meat inspection became quite lax. Studies made in coöperative slaughterhouses throughout the country revealed that 1.25 per cent of all beef cattle and 0.7 per cent of all calves were found to be infected. The incidence of *T. saginata* reveals a similar increase with the peak occurring in 1946 with 3.6 persons per 10,000 inhabitants treated for this tapeworm in various Danish hospitals.

Five times as many women as men were infected. The investigators theorized that the handling of the uncooked meat in the kitchen is more significant as a means of spreading the disease than is the eating of cooked meat. It should be stressed that most of the cases of cysticercosis in the animal are single cases. Very few cysts have been found in the cattle which came from many widely separated farms. This suggests that close contact with a human tapeworm carrier on the farm is not necessary to cause infection of cattle, but that the tapeworm eggs may spread by means of contaminated feed, water, and liquid manure as it was found the eggs would remain viable for sixteen days when stored in sewage and for thirty-three days when stored in water. Eggs exposed on grass in the open air have remained viable up to 159 days. During hot weather, however, considerably larger number of eggs will survive in fluid mediums than on grass. Desiccation at relatively higher temperature apparently kills most or all of the eggs in grass.

Apparently, large numbers of eggs must be ingested if cysts are to be produced. The numbers of Cysticercus organisms resulting from feeding calves doses of 30 to 100 tapeworm eggs are not extensive, but in heavily infected calves killed nine to ten months following infection, about 75 per cent of the bladder worms were still viable.

Reports covering animal diseases not usually communicable to man were similar to those on diseases communicable to man in that they showed a definite increase in the incidence of the disease following the occupation of the low countries during World War II.

SALMONELLA INFECTIONS

The sections of the Congress on Salmonella infections heard several interesting reports from a veterinary public health standpoint, particularly those from France, England, Norway, Holland, and the report given by Dr. W. R. Hinshaw of the United States.

The reports from England and Holland discussing salmonelloses in farm animals, particularly the latter report, was concerned with *Salmonella dublin* carriers in cattle, for *S. dublin* is considered the most serious human Salmonella infection in Europe. Although it was difficult to determine the extent and spread of this disease in cattle, the reports indicate that it has increased markedly in the past few years. The danger to public health lies especially in the contamination of meat and milk. Bovine carriers of *S. dublin* are, as a rule, clinically healthy, and after slaughter no alterations pointing to a Salmonella infection can be found. In the report from Holland, it was pointed out that 6 out of 7 clinically recovered animals had become carriers of *S. dublin*. Such animals passed for food consumption without further examination may lead to an outbreak of Salmonella infection in man. Several outbreaks of meat poisoning in the Netherlands during the last few years have been accounted for in this way.

The danger of human infection from milk arises chiefly from the fact that in sheds housing one or more carriers, contamination of all milk produced in the shed can not be prevented. It was pointed out that certified raw milk may be particularly dangerous in carrying the infection from animal to man, necessitating pasteurization of milk from farms with carriers before human consumption of the milk. Several cases were reported in which the resistance of the patients had been weakened by other diseases, one case in particular in which a 2½-year-old farmer's daughter, recovering from another condition, contracted a fatal Salmonella infection. This individual had

consumed raw milk at the farm among whose cattle there were several Salmonella carriers. This problem was so serious in Holland that investigators were recommending that bovine salmonellosis be included under their "contagious disease act" which requires that certain extensive examinations be made of the animal in addition to the routine meat inspection carried out in the slaughterhouses. *Salmonella dublin* infection in cattle was considered one of the most important salmonelloses by the English workers in their report which dealt mostly with this and other infections in livestock. It was likewise pointed out that these infections had been on an increase during the last few years.

A French report dealing with the rural *Salmonella abortus equi* infection in relation to human and veterinary medicine pointed out that the pathogenic action of *S. abortus equi* is not necessarily, as once thought, restricted to infectious abortion in mares or multiple lesions in the foals. It was shown that it could bring about different symptoms such as orchitis, abscesses, bursitis, lesions of the withers, and septicemia. This particular organism has not lent itself to very satisfactory treatment. Therefore, infected animals should be under strict supervision for a long time. This report included the incidence of 4 human infections, which apparently is very exceptional. There was no doubt in these cases, however, because the organism had been isolated from the individuals. Since much horse meat is eaten in France, the investigators believe the only adequate safeguard for the consumer is bacteriologic inspection of the meat.

Dr. W. R. Hinshaw's report on salmonellosis as a veterinary public health problem in the United States suggested that Salmonella infections generally are on the increase. He particularly pointed out that the number of instances in which Salmonella species, formerly considered nonpathogenic to man, are shown to produce enteritis and similar infections, the most recent of these being *Salmonella pullorum*. He pointed out that three types, *Salmonella typhimurium*, *Salmonella choleraesuis*, and *Salmonella oranienburg*, are especially important causes of disease in animals, including man. Ways in which the veterinarian can aid in reducing human infection as well as animal losses for salmonellosis were outlined: "(1) A concerted effort to aid farmers in eradicating these diseases from farm animals; (2) by aiding research groups, diagnostic laboratories, and public health authorities in making surveys on incidences of Salmonella in all types of animal and insect life; (3) by discouraging the sale of visibly sick animals for food purposes; (4) by coöperating with health authorities in improving sanitation in food handling and processing plants where Salmonella and similar infections are likely to be disseminated." It was suggested that veterinarians in small animal practice might well devote some time to a study of this group of diseases as a possible cause of illness in cats and dogs to reduce losses, as well as to aid in the prevention of possible transmission to human beings from carriers in these species.

RABIES

Dr. W. A. Hagan, of the United States, discussed the reliability of laboratory methods for diagnosis of rabies and diagnosis by animal inoculation, and the failures of diagnosis when based primarily upon the presence of Negri bodies. He also summarized the outbreak of rabies in foxes and other animals during 1946, 1947, and 1948. It was emphasized that both the identification of microscopic lesions or Negri bodies and animal inoculations must be carried out in order to obtain a high order of diagnostic accuracy.

An extensive report by Dr. Schwanner, Budapest, Hungary, entitled "The Preventive Vaccination of Dogs as a Method of Eradication of Rabies," emphasized some veterinary public health aspects of the control of rabies. This disease can be controlled not only by eradication but by strict enforcement of established regulations such as registration, taxation, destruction of ownerless or rabid dogs, or of dogs suspected of rabies, and the regulation governing the importation of dogs. Reference was made to the enforcement of such measures resulting in the eradication of the disease, particularly in England, and a considerable reduction in other areas. The voluntary preventive vaccination of all dogs, which was started in Hungary in 1929 and continued until 1943, showed definite re-

sults in reducing the incidence of the disease. However, in those areas in which there was a concentration of the infection, it was considered advisable to carry out compulsory immunization. Compulsory immunization invariably has been followed by a sharp reduction in the incidence of the disease, and by complete eradication in many areas. These outstanding results must also be attributed in part, however, to the strict enforcement of sanitary measures, particularly the persistent collection of ownerless and vagrant dogs. Very good evidence that compulsory vaccination will eliminate the disease was shown by the prewar, war, and postwar experience in Hungary. After successful control in the prewar years, the incidence of rabies definitely increased when the program could not be continued due to war conditions. When the system of compulsory vaccination was carried out, postwar, in large areas, rabies was eliminated in those areas.

Optional vaccination such as we have in the United States may bring about a decrease of rabies, probably proportionate to the percentage of dogs so treated, but it is the opinion of some that it will never stamp out the disease. Compulsory vaccination of all dogs, combined with strict application of sanitary measures, eliminates the disease even in countries with artificial borders and adjoining other countries where rabies is prevalent. Discussion of the program in Hungary revealed that, upon compulsory vaccination in the rural areas, particularly among shepherd's dogs, there was a sharp reduction in the incidence of the disease in other animals, particularly livestock.

OTHER DISEASES

At the meeting of the National Veterinary Medical Association of Great Britain and Ireland, held as part of the International Veterinary Congress, a discussion entitled "The Diseases of Household Animals Communicable to Man" was given by Dr. Winsser, from the Institute for Preventive Medicine, Department of Bacteriology and Experimental Pathology, Leyden, Holland. Most small domestic animals in the Netherlands are family pets, with the animal often sleeping in the same bed with human members of the family. Food is often transferred from the human mouth to the muzzle of the dog, or the beak of a pigeon. It is fortunate that, in this region, small animals are rarely carriers of dangerous pathogens communicable to man, like rabies, histoplasmosis, and kala-azar. Even so, some diseases of pets are a threat to public health. A number of human beings suffering from open tuberculosis of the lungs have infected their dogs, and in tuberculosis of the dogs, exchange of infection to cat and man may occur.

Leptospirosis, an important disease of man and dogs in Holland, is transmissible from dog to man. It was the opinion of the author and other workers that *Leptospira canicola*, which is a common infection in man, may not always be recognized. The clinical picture may resemble an influenza-like disease, instead of the typical *Leptospira icterohaemorrhagiae* infection. In the latter case, the diagnosis is definitely established by the isolation of the organism from the patient's blood. In only a few cases has it been definitely shown that *L. canicola* infection occurred in man by isolation and identification of the Leptospira from the patient's urine. However, it has been shown that many individuals have a high titer to *L. canicola*.

Winsser has shown that Salmonella infections may occur in dogs and has isolated *S. dublin* from the blood of 2-year-old dogs with fever, anorexia, and general malaise. Salmonella infections occurred fairly frequently in dogs and less frequently in cats. The infection may run an atypical, subclinical course with a few symptoms such as fever and general malaise, with or without severe gastroenteritis. In several instances, strains of streptococci have been isolated from dogs and cats. These strains are similar to, if not the same as, the strains of milk-borne epidemics in man.

In the discussion of the diseases of household animals transmissible to man, it was pointed out that certain parasitic skin diseases could be transmitted from dogs to man. Also, there is a fungus infection in chickens, *Microsporum gallinae*, that has been transmitted to children.

Toxoplasmosis is widespread in man and animals throughout the Netherlands. Many workers feel that the infection may be transmitted either from man to animals, or from animals to man.

The incidence of echinococcosis in the dog in the Netherlands has been definitely on the increase, particularly since World War II. Study of the reports of the various slaughterhouses throughout the country showed an increase in the incidence of canine echinococcosis. The draught dog is also suspected of contributing to the circulation of the parasite in man and animals by spreading its infectious material throughout the country. It was pointed out that direct contact between dog and man is not the only means of contracting the disease. Contamination of vegetables and fruits from dogs' feces is possible, because the resistant worm eggs may remain fertile for at least a year. Despite these dangers, however, there has been some decrease in the incidence of echinococcosis in human beings over the last several years.

SUMMARY

World War II resulted in a breakdown of animal disease-control measures, with an increased reservoir for human disease, followed by an increased incidence of human infection regardless of etiology. The food shortage, particularly of meat and meat products, which exists at this time in many parts of the world, calls for the international consideration of veterinary medical problems related to the control of animal diseases, as well as their public health aspects. It was proposed that the Congress express a need for uniform rules for the importation of animals and animal products, and that it request the Office Internationale des Epizoöties in Paris to undertake elaboration of a system for animal disease control that might be submitted to the governments of the different countries for consideration. It was likewise recommended that a more adequate system to report outbreaks of human and animal diseases be worked out between the various countries.

Resolutions dealing with brucellosis, rabies, and tuberculosis were introduced. These emphasized, generally, that further studies should be made of the relationship of the incidence of disease in animals to the presence of infections in human beings. The World Health Organization was urged, by formal resolution, to establish a veterinary public health section. The World Health Organization was likewise asked to set up an international influenza-typing station adequate to study the relationship of this disease with animal diseases in coöperation with the International Influenza Center at the National Institute for Medical Research, London, England.*

A special meeting was held by the Food and Agricultural Organization of the United Nations dealing with foot-and-mouth disease. Certain resolutions were aimed at establishment of closer coöperation between the various countries dealing with foot-and-mouth disease, and recommended that definite regulations be set up regarding the use of vaccine and vaccination.

The Mortality of Higher Life

Despite two world wars, death rates are far from being as high as fifty years ago. The human mortality per 1,000 in 1901 was 27.8 for Spain, 22.3 for Germany, 22.0 for Italy, 21.5 for France, 16.0 for Sweden, 18.8 for England and Wales, and 15.7 for the United States. At the present time, a survey by the World Health Organization shows a decrease of 30 to 58 per cent, thanks to the cool, calculating disciplines of medical, veterinary, and agricultural sciences. Although there are no comparable figures available for domestic animals, suffice to say that epizoötics out of control are a thing of the past.

The average farmer in the Middlewest loses about $120 per year, according to a survey of the cost of livestock disease losses. At least half of these losses could be prevented by greater attention to sanitation and nutrition, by adequate equipment, and by early diagnosis and treatment. These losses do not include poor use of feed because of parasites and other nonfatal diseases.

It would seem that direct contact with infective animals is a much more effective way to become infected with animal diseases than working with cultures in the laboratory.—*N. B. McCullough, M.D., Illinois.*

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*Coöperating laboratories in the United States are sending strains of virus to the National Influenza Serain Center under Dr. T. P. McGill, Long Island Medical College, Brooklyn, N. Y.

More Highlights of the Eighty-Seventh Annual Meeting Miami Beach, August 21-24, 1950

A Visit to Havana

AVMA members, many accompanied by their families, who visited Havana following the meeting in Miami Beach were able to see a great deal of Cuba, thanks to the excellent organization of Cuban veterinarians and their wives.

A tour of the city included visits to such important places as the Capitol, Morro Castle, Church of Our Lady of Mercy, the older part of Havana which is filled with Spanish traditions, and the new modern residential sections with their beautiful boulevards and luxurious residences.

The visits to the stores and restaurants were a new experience and will provide topics for conversation for years to come.

On Sunday, the Women's Auxiliary to the Cuban Veterinary Medical Association entertained the ladies at a luncheon at the Professional Club of Cuba. More than 200 guests were welcomed by Mrs. R. Parajon, president of the Women's Auxiliary. Mrs. V. H. Miller responded on behalf of the AVMA Auxiliary, and Mrs. A. E. Bott on behalf of the International Auxiliary.

As indicated in the October JOURNAL (pp. 290-292), the official adjourned sessions of the Miami Beach Session were well attended, as befitted the excellent arrangements which had been made for them.

Again, we can say that the only item of the tour which was not entirely up to expectations was the weather. Without exception, the visitors took the inclement weather as a matter of course and enjoyed their visit to the full. On the other hand, the local committee members seemed to feel personally responsible for the weather and we regret that they were so disturbed by this uncontrollable element.

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Meeting of Deans.—The Association of Deans of the American Colleges of Veterinary Medicine met on Aug. 22, 1950, at Miami Beach.

The assembled group discussed the problem of fair handling of the displaced veterinarian. Because it is difficult to evaluate the credits of a veterinarian trained in a foreign school, the problem of admitting such graduates to American colleges of veterinary medicine for graduate study presents a problem which must be handled individually and on the basis of the university rules which govern each respective college.

The deans discussed the current draft status of veterinary students, and the possibility or probability of being asked to again institute a program of accelerated training.

Other questions considered at this meeting were the possibility of establishing a uniform type gown for graduates in veterinary medicine to wear at graduation and other scholastic functions, the personnel and status of the National Board of Veterinary Examiners, the deliberations and actions of the Fifth Annual Conference on Higher Education, and some method of more closely integrating student chapters with the AVMA.

The present officers were reelected: H. D. Bergman, president; W. A. Hagan, vice-president; C. S. Bryan, secretary-treasurer.

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Dr. Mayo Awarded Twelfth International Veterinary Congress Prize

At the Miami Beach Session of the AVMA, Aug. 21-24, 1950, Dr. N. S. Mayo of Highland Park, Ill., was the recipient of the Twelfth International Veterinary Congress Prize. The award is based on "outstanding service by a member of the AVMA to veterinary medical science and the profession."

A member of the AVMA since 1891, Dr. Mayo served as executive secretary from 1913 to 1915 and again from 1918 to 1922. He was a member of the AVMA Committee on Education from 1928 to 1943, and was its chairman from 1931 to 1943. Dr. Mayo is responsible for the AVMA JOURNAL, in that he recommended that the Association publish a journal of its own, which led to the purchase of the *American Veterinary Review* in 1915 and

Dr. N. S. Mayo

its emergence as the JOURNAL of the AVMA. He also edited the first directory of the AVMA (1920-1921).

Unfortunately, Dr. Mayo was unable to be present at Miami Beach on account of illness.

Dr. L. A. Merillat, Chicago, Ill., received the AVMA Award at Miami Beach and Dr. James Farquharson received the Borden Award (*see* October JOURNAL, pp. 278, 280).

• • •

International Tour Group.—Members of the group which attended the Fourteenth International Veterinary Congress in London in 1949 (Cooks' 602 Club) met at the Kingston Hotel in Miami Beach for dinner and a social hour on Aug. 23, 1950. The 33 members who were able to attend enjoyed a showing of motion pictures and color transparencies of scenes which had been photographed by various members last year. These pictures and the discussions which they provoked helped to revive memories of the many persons and places visited during the tour.

The meeting was so enjoyable and the visiting so successful that a similar meeting of the group is planned for 1951 at Milwaukee.

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The N.A.F.V. Meets.—The National Association of Federal Veterinarians met informally at the Sea Comber Hotel, Miami Beach, Aug. 22, 1950. A total of 35 members from 12 states were present to welcome 5 members from Puerto Rico.

No official action was taken on any of the items discussed, but these will be presented to the regular annual meeting of the Association, which will be held at Phoenix, Ariz., in November. Dr. E. C. Cannon is the secretary-treasurer.

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Zoo Veterinarians.—At the fourth annual meeting of the zoo veterinarians on Aug. 20, 1950, during the AVMA session in Miami Beach, the following case reports were given:

Dr. Lester Fisher, Lincoln Park Zoo, Chicago: "Recent Illness of the Gorilla, Bushman."

Dr. Charles Rife, Atlanta, Ga.: "Fracture of the Elbow in the Elephant, Coco."

Dr. Walter Brewer, New Orleans, La.: "Bacitracin in the Treatment of Coccidiosis of Monkeys."

Dr. Estelle Hecht, Ithaca, N.Y.: "Respiratory Infection in Laboratory Rats in the Research Laboratory of the Kingsbridge Veteran's Hospital."

Dr. Elihu Bond, Brookfield Zoo, Chicago: "Fracture of the Mandible in a Kangaroo."

Dr. J. A. Campbell, Toronto, Canada: "Postmortem Examination of a Hippopotamus," "Recovery of a Lioness from Posterior Paralysis," "Scours in Deer Fawns," and "Diet for a Baby Moose."

Dr. Patricia O'Connor, Staten Island, N.Y.: "Removal of a Carcinoma from the Cloaca of a Reticulated Python and the Subsequent Postmortem Findings."

The attendance at the meetings has increased each year. In addition to the zoo veterinarians, others in the fields of public health, fur farming, and experimental laboratories attended.

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The A.A.H.A. at Miami Beach.—The American Animal Hospital Association held its semiannual business meeting and luncheon at the Hotel Saxony, Miami Beach, Tuesday, Aug. 22, 1950.

The featured order of business for the 40 members who attended was a preliminary discussion of the plans for the 1951 meeting to be held at Atlantic City, N. J., at Chalfonte-Haddon Hall, May 2 to 5. Hotel facilities have been surveyed by Dr. M. L. Morris. The chairman of the program committee, Dr. G. B. Schnelle, has been actively at work, and the chairman of the local arrangements committee, Dr. J. A. S. Millar, has made a survey of the entertainment which will be available.

• • •

Meeting of the Veterinary Public Health Board.—The American Board of Veterinary Public Health was incorporated under the laws of the District of Columbia on Feb. 3, 1950, as a nonprofit, educational organization. The purposes of the Board are (1) to further the educational and scientific progress in the specialty of Veterinary Public Health and to encourage education, training, and research in that specialty; (2) to establish standards of training and experience for qualification of specialists in Veterinary Public Health; and (3) to further the recognition of such qualified specialists by suitable certification and other means.

Veterinary public health is defined by the Board as: all community efforts influencing and influenced by the veterinary medical arts and sciences applied to the prevention of disease, protection of life, and promotion of the well-being and efficiency of man.

The Board held its annual meeting on Aug. 21, 1950, at Miami Beach, Fla., during the AVMA convention. A constitution was adopted, plans were formulated for the future work of the Board, and the following officers were elected: Lt. Col. Frank A. Todd, U. S. Army Veterinary Corps, president; Dr. H. J. Stafseth, professor and head of the Department of Bacteriology and Public Health, School of Veterinary Medicine, Michigan State College, vice-president; Dr. Benjamin D. Blood, chief of the Veterinary Public Health Section, Pan American Sanitary Bureau, secretary; Dr. Martin D. Baum, director of Veterinary Public Health, Colorado State Health Department, treasurer.

Correspondence should be addressed to the secretary at 6315 Utah Avenue, N. W., Washington 15, D.C.

SURGERY & OBSTETRICS
AND PROBLEMS OF BREEDING

Kuentscher's Medullary Nailing in Femur Fractures of the Dog

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Philadelphia, Pennsylvania

SEVERAL articles have been published in this country since early 1948 about intramedullary pinning. It seems unnecessary to add another contribution on the same subject. However, there is a principal difference between the techniques described by Frick,[1] Brinker,[2] Bernard,[3] and Jonas[4] and the Kuentscher method.[5] The Kuentscher method consists of the insertion of a long V- or U-shaped steel rod, the medullary nail, through a small incision distant from the fracture field into the bone, uniting the fragments so firmly that the limb can be immediately lifted and actively moved, even permitting functional use without any additional external support within a few days. After bony consolidation, this medullary nail can be easily removed by means of a hook inserted in a hole provided for this purpose at the end of the nail. The principal difference between the "intramedullary pinning" as described by the above authors[1-4] and the "medullary nailing" of Kuentscher is the type of nail used. To provide a solid fixation with a round pin, a steel rod which fills the medullary cavity nearly as snugly as the plunger in a syringe has to be used. Brinker[2] says, "Results were best when the diameter of the pin approximated the diameter of the marrow cavity . . . "; or, according to Jonas,[4] "In order to get optimum results it is necessary to use pins of sufficient diameter to fill the intramedullary space . . . " With the Kuentscher nail, the situation is entirely different. The V- or U-shaped cross section provides absolutely solid fixation, controlling rotation as well as axial displacement by means of adhesive forces between the nail and the inner cortex of the bone at two or three points, without filling the whole lumen of the marrow cavity (fig. 1c).

We first used Kuentscher's medullary nailing on femur fractures in 1943 in Switzerland and reported on a limited number of cases in 1945.[6]

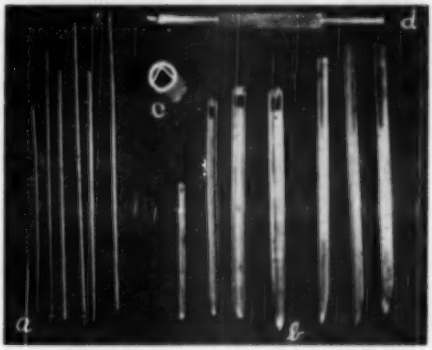


Fig. 1—(a) Various sizes of guide pins; (b) Kuentscher nails; (c) cross section through shaft of femur with Kuentscher nail inserted; (d) driving punch for Kuentscher nails.

In 1947, further experiences were published in France.[6] Kuentscher himself reported the results of his experimental work on dogs previous to the introduction of the method in human medicine in 1940;[7] more recently, we find publications on Kuentscher's medullary nailing in dogs by Griessmann[8] and Schebitz[9] in Germany.

The literature on Kuentscher nailing in human medicine is enormous. Boehler[10] dedicated a whole volume of his three-volume compendium on fracture treatment to Kuentscher's medullary nailing, and gives a review of more than 600 case histories and a bibliography of some 170 publications. Roth,[11] Maatz,[12] and Fitts[13] studied, in animal experiments, the effect of the medullary nail with regard to the bone marrow, the bone, the danger of fat embolism, and the callus formation. A

Presented with a motion picture at the Forty-Ninth Annual Conference of Veterinarians, School of Veterinary Medicine, University of Pennsylvania, January 4-5, 1949.

Dr. Jenny is associate in veterinary surgery, School of Veterinary Medicine, University of Pennsylvania, Philadelphia.

critical evaluation of the merits and inherent dangers of any new method is only possible by using it on a large number of cases and being able to follow them over a long period. The great number of fracture patients presented at the

Fig. 2—Lateral view of left femur (a) French Poodle; (b) German Shepherd. Note that "a" is completely straight and "b" shows a marked curve in the distal third.

School of Veterinary Medicine, University of Pennsylvania, offered an excellent opportunity to make a comprehensive survey of the indications, technique, and final results. Previous experience could be enlarged through the application of the method in a great variety of different fracture types, and we kept records on patients abroad operated upon as long ago as five years.

The great advantage of Kuentscher's medullary nailing is that the Kuentscher nail can be inserted from a point distant to the fracture site without direct exposure of the fracture field. To carry out this procedure, the human surgeon uses two mobile x-ray units to permit constant biplane fluoroscopic supervision. It is of course out of the question to carry through a similar procedure in veterinary medicine. We first did all our medullary nailings with exposure of the fracture field; later, we attempted a closed nailing and resorted to the open one only if the closed procedure was not successful. Finally, we found that in properly selected cases, closed medullary nailing of femur fractures may be performed without fluoroscopic control, while in a second group, closed medullary nailing is *a priori* contraindicated and, therefore, an open nailing is to be performed without an attempt to carry out a closed reduction.

Medullary Nailing Without Exposure of Fracture Field

Indications.—Particularly suited for closed medullary nailing are transverse and short, oblique fractures in the middle third of the femur. Transverse and short, oblique fractures in the proximal and distal third are also suitable, provided there is ample space to anchor firmly the medullary nail in the short fragment.

Contraindications.—Closed medullary nailing should not be attempted in long, oblique fractures with sharp ends of the fragments, in spiral, comminuted, multiple, or old fractures.

Time of Operation.—Closed medullary nailing can be performed any time within ten days after the fracture occurred, as soon as the patient's condition permits general anesthesia. In young individuals, this time limit may be shorter due to early callus formation.

Preoperative Preparation.—(*a*) Determination of the Length, Width, and Curve of the Medullary Canal.—Correctly focused x-ray pictures, showing the femur in exactly anteroposterior and mediolateral view are necessary to determine the diameter and length of the nail to be used. If a uniform focusing distance of 70 cm. is used, allowance must be made for the enlarged projection due to bone-film distance, *i.e.*, about 1 mm. must be deducted from the width indicated by the x-ray picture at the narrowest point. If the bone shows a marked curve (fig. 2), the next thinner nail must be used. As a rule, the nail should be long enough to cover the entire length of the medullary cavity, extending from the top of the greater trochanter to the cancellous bone of the distal epiphysis, regardless of the level at which the fracture is located. However, in fractures of the upper third, the nail may be somewhat shorter than the total length of the medullary canal, whereas in those of the distal third it has to be firmly anchored in the cancellous bone of the distal epiphy-

sis. Success or failure of the operation depends, to a great extent, upon exact measurements. Difficulties will arise during the operation from the use of too thick a nail which, if it is forced, may split the cortex. Postoperative difficulties appear if too thin or too short a nail is used, giving insufficient stability, resulting in rotation or angulation. It is always advisable to have two or three nails of different sizes in a set which may be interchanged if a mistake in measurement occurred.

b) Instruments.—The following instruments are needed for medullary nailing without exposure of the fracture field:

1) reduction apparatus, *i.e.*, Gordon extender;
2) towel clamps, stockinette, drapes;
3) knife, scissors, hemostats, suture material;
4) straight or curved awl for piercing of the bone to open the medullary cavity (fig. 3a);
5) guide pins of various length and diameter (Kirschner wires and Steinmann pins) (fig. 1a);
6) handle for guide pin (fig. 3b);
7) Kuentscher nails of various length and diameter. (It is a "must" to use nails of absolutely rust-proof material such as V$_2$A steel or 18-8 S.M.O. stainless steel) (fig. 1b);
8) driving punch (fig. 1d);
9) hammer, weighing at least ½ to 1 lb.;
10) nail extractor.

c) Preparation of Patient.—The hair of the broken leg is clipped with a fine clipper from the sacral region down to the hock joint, both laterally and medially. If the area is to be shaved, this should be done twenty-four hours prior to the surgery. The leg is washed with soap and water and dried with ether.

The choice of the anesthetic is based on the age and the general condition of the patient. The duration of the operative procedure may be from fifteen minutes to one hour.

With the patient in lateral position, the normal leg is fixed in complete extension and the Gordon extender bars tightened. The broken leg is fastened to the extension hook so that, before the screw is tightened, the leg is under slight tension in order to permit a possible overextension during the reduction of the fracture. Fractures of the distal third sometimes necessitate the application of direct bone traction by calipers.

d) Reduction of Fracture.—Under slowly increasing traction, the fracture is now manually reduced. Lateral displacement generally can be overcome if the fragments are slightly distracted and a slight lengthening produced. After the fragments are approximated, the operator starts to scrub and the operative field is prepared with iodine-alcohol or roccal-alcohol, the leg placed in a stockinette and draped with sterile drapes. There is no need for assistance during the operative procedure other than to manipulate the extension screw on the Gordon extender.

Operative procedure.—A 2-cm. incision (fig. 3a) is made about 1 cm. above the tip of the greater trochanter. Through this incision, the awl is inserted just medial to the greater trochanter into the subtrochanteric fossa. With the tip of the instrument, the deepest point of the fossa is palpated and the correct position tested by moving the instrument outward and forward. If solid resistance against the trochanter is felt, a hole is drilled to open the medullary cavity.

By means of its handle, the guide pin is inserted through the hole made by the awl (fig. 3b). This pin should slip in fairly easily. Great resistance usually indicates that the pin is taking a wrong course and has been caught in the cortex. To check the position of the guide pin, it is inserted a very short distance into the upper fragment. When the handle is moved in a circle, the lumen of the medullary cavity is outlined with the tip of the pin. It is then driven downward toward the fracture field. If a perfect reduction was made and not disturbed by the manipulations with the awl and the guide pin, it can be driven directly into the lower fragment until resistance is felt from the cancellous bone at the distal epiphysis. This ideal case unfortunately is quite rare. Usually, an accurate reduction has to be made by slight angulation of the two fragments while the tip of the guide pin just protrudes from the distal end of the upper fragment, ready to be pushed downward as the angulation is straightened out. To check if the fragments are now held in good apposition by the guide pin, they are moved against each other in mediolateral, as well as in anteroposterior, direction. With good apposition, only a very slight movement is felt because of the axial fixation by the guide pin.

As soon as the guide pin is found to be in good position, the nail is driven in over it

(fig. 3c). If a slight lateromedial or anteroposterior displacement persists, the nail may hit the cortex when it enters the fracture area. If this happens, the nail must be slightly withdrawn and the reduction readjusted before it is driven in, otherwise it will split the lower fragment. As soon as the end of the nail approaches the skin incision, the guide pin is removed and the nail inserted until its end is just on a level with the top of the greater trochanter (fig. 3d).

The skin is closed with one or two mat-

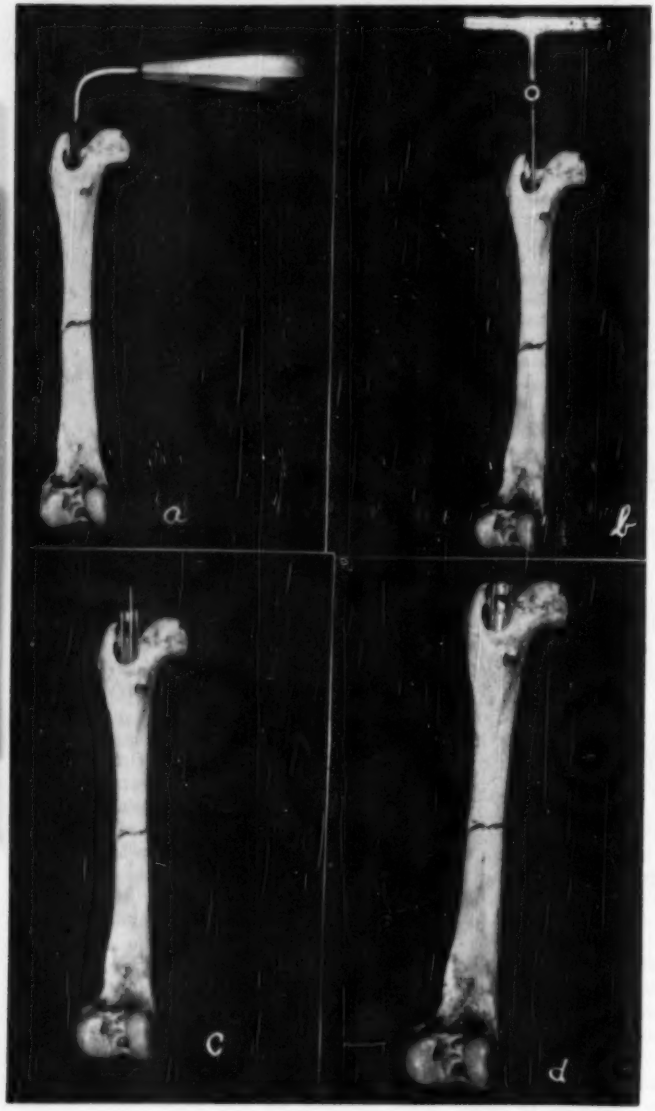


Fig. 3—(a) Awl inserted in subtrochanteric fossa to open the medullary cavity;

b) guide pin inserted;

c) Kuentscher nail inserted over guide pin;

d) guide pin removed, Kuentscher nail inserted until its end is on level with greater trochanter. Note hole in which hook of extractor is inserted for removal.

tress stitches and the incision covered with collodion.

MEDULLARY NAILING WITH EXPOSURE OF FRACTURE FIELD

Indications.—Open medullary nailing is to be performed in all of those cases where closed medullary nailing is contraindicated, *i.e.*, long, oblique fractures with sharp ends of the fragments, and spiral, comminuted, multiple, and old fractures. It is indicated also for the treatment of nonunions, or for correction of fractures healed with angulation or rotation that impair normal use of the leg. We must bear in mind that if an open medullary nailing is performed, the most precious virtue of Kuentscher's method, *viz.*, minimization of the danger of infection, is lost. However, with today's standard of veterinary surgery, less damage is done by performing an open reduction than by long and violent closed reduction manipulations which cause additional injury in the region of the fracture, especially if the ends of the fragments are sharp.

Contraindications.—Local inflammation of the bone, impairment of muscles and joints, and pathologic conditions of the skin.

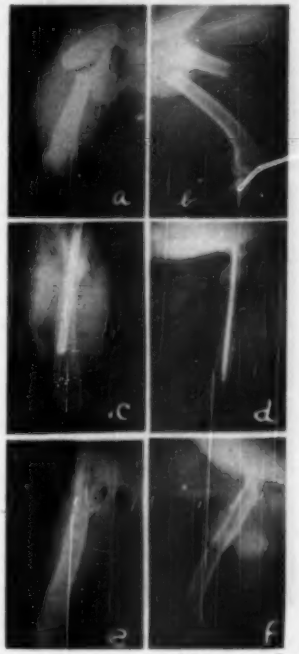
Time of Operation.—Open medullary nailing can be performed any time after the fracture hematoma is organized and after the time of maximum decalcification of the fragments, *i.e.*, after the pH of the fracture hematoma has returned from acid to alkaline. In most cases, this would make the eighth or tenth day after the fracture occurred the time of choice, but the operation can be undertaken several months afterward, providing there is no impairment of muscles and joints.

Preoperative Preparation.—(*a*) Determination of Length, etc.—The determination of length, width, and curve of the medullary canal would be made as outlined above under closed medullary nailing.

b) Instruments.—In addition to the instruments used for closed nailing the following items are needed:

11) Michel clamps (to fix the stockinette to the skin around the operative field);
12) Lambotte bone forceps (8¾" over-all length);
13) bone elevator;
14) bone saw (Gigli or Jefferson saw);
15) Luer rongeur;
16) Parham-Martin band with tightener.

c) Preparation of Patient.—In addition to the preparation outlined under closed medullary nailing, it is advisable to provide an infusion or transfusion during the open medullary nailing. Physiologic saline, saline-glucose or Ringer's solution, gelatin or, even better, whole blood is given slowly to maintain the blood volume.



—*University of Pennsylvania*

Fig. 4—(a, b) Three-day-old transverse fracture, upper third of right femur; (c, d) after closed medullary nailing; (e, f) three months later, nail removed.

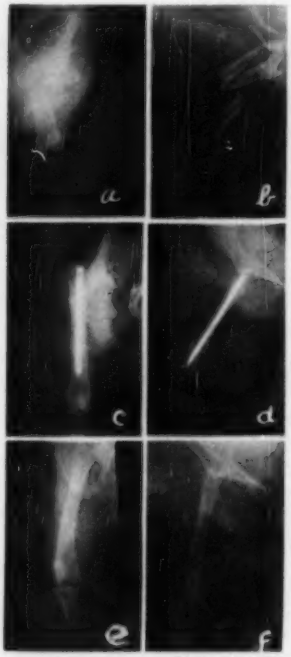
Anesthesia is similar to that described for closed medullary nailing.

Application of Gordon extender is similar to that described for closed medullary nailing. In open medullary nailing, the Gordon extender may not be necessary, but it is always advisable to have it in place in case extra tension may be needed.

d) Reduction of Fracture.—A reduction of the fracture before the operation is not to be attempted, because the object in doing the open reduction is to avoid manipulations with additional damage to the surrounding tissue.

Operative Procedure.—In order to make

a proper anatomic approach, it is necessary to have a long skin incision. The incision should start about 1 cm. above the tip of the greater trochanter, be carried forward horizontally about 2 to 4 cm., according to size of dog, and then directed downward toward the stifle, thus taking more or less the shape of an inverted L. The skin is reflected on both sides, and the lateral aspect of the thigh muscles can be observed. Starting at the greater trochanter, the fascia lata is split from the anterior part of the greater trochanter toward the stifle. This opens the space between the vastus lateralis and the biceps muscle; subsequently, the deep fascia is dissected and the fracture hematoma opened by blunt dissection. With this approach, it is possible to locate the two fragments without cutting a single muscle.



—*University of Pennsylvania*

Fig. 5—(a, b) Eight-day-old spiral fracture in upper third, and transverse fracture in distal third of femur; (c, d) after open medullary nailing; (e, f) four months later, after removal of nail.

The proximal fragment is grasped with a bone forceps. If some callus formation is already present, it is trimmed off with a curette, or a small piece of bone may be cut off with a chain saw. In this manipulation, care should be taken that the periosteum is handled as delicately as possible. The medullary cavity is opened next, through the subtrochanteric fossa, as described in the closed procedure. From the fracture site, a guide pin is driven upward into the trochanteric region to make sure that the hole was drilled at the correct place. Over the guide pin, the Kuentscher nail is driven from the subtrochanteric fossa downward until its tip just appears at the lower end of the proximal fragment. At this point, the distal fragment is seized and, after possible callus formation is trimmed off, the two fragments are brought into apposition.

—*Ecole National Veterinaire, Alfort, France*

Fig. 6—(a, b) Three-month-old transverse fracture in distal third of femur; (c) after osteotomy and medullary nailing; (d) seven months later. Note that no irritation from nail or change in its position occurred.

In the case of an old fracture, with con-

siderable shortening of the quadriceps muscles, the recovery is more rapid as well as more complete if a short piece of bone is sacrificed to avoid stretching of the muscles during the approximation of the fragments. After the two fragments are in proper alignment, the guide pin is pushed into the lower fragment and a last little angulation or possible rotation may be corrected before the Kuentscher nail is driven into the distal fragment. As in the closed reduction, the guide wire is extracted and the Kuentscher nail inserted until its end is just on the level with the tip of the greater trochanter. In case of a comminuted fracture, smaller fragments are best removed, but larger ones should be anatomically replaced (fig. 5). For this purpose, the Parham-Martin band may be helpful. We used to hold the loose fragments together with a wire loop, but quite frequently the callus formation was inhibited at the point where the loop was placed. More recently, we have made loops with No. 2 medium chromic catgut which seemed to be quite satisfactory.

The deep fascia and the fascia lata are closed by interrupted stitches with catgut, and the skin with stainless steel, silk, or dermalon.

As a rule, penicillin is given for three or four days after the operation. An external support is not necessary, except in cases of multiple fractures or comminuted fractures. In those instances, it is advisable to fix the leg for about two weeks under moderate tension in a Schroeder-Thomas splint.

REMOVAL OF MEDULLARY NAIL

The medullary nail must remain *in situ* until the fracture is consolidated by bony union. In old dogs, it may even remain permanently in the medullary cavity. In younger individuals, it is advisable to remove the nail about three to four months after the operation. So far, we have had 3 patients that showed perfect use of the fractured leg for several months and then suddenly started to manifest some sort of rheumatic pain and favored the operated limb. Removal of the nail corrected this trouble in each case. The extraction of the nail is a minor procedure, which consists of a small skin incision over the greater trochanter, through which a hook is inserted into the hole provided for this purpose at the end of the nail, and it is withdrawn. Although it is extremely difficult to extract a partially introduced nail during the operation, it is easily removed after it has remained for three to four months in the medullary cavity. Roth[11] showed in his histologic sections that at the points where the nail touches the inner cortex a slight pressure necrosis takes place, and that after four to five weeks, a fine membrane is formed around the foreign body.

SUMMARY

Kuentscher's medullary nailing has been used for the repair of various types of femur fractures in dogs since 1943. The V- or U-shaped Kuentscher nail gives a most accurate reduction and absolutely solid fixation, permitting function of the injured limb as soon as four days after the operation without external support. Indications, contraindications, and technique for Kuentscher nailing, without and with exposure of the fracture field, are described.

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Intrauterine Antibiotic Treatment of Vibrionic Sterility in Dairy Cows

So-called "breeding trouble," characterized by failure to conceive after several services, is commonly associated with outbreaks of vibriosis. As a rule, these animals do not reveal detectable abnormalities of the genital tract on physical examination. Heat periods are usually regular but the animals fail to conceive even after repeated services.

Intrauterine infusions of penicillin were used successfully by Chambers (*North Am. Vet., 29*, 1948: 640) in the treatment of 5 "nonbreeding" cows. Since *in vitro* tests (unpublished data) have shown that *Vibrio foetus* is susceptible to streptomycin, the writers decided to try intrauterine infusions of streptomycin* alone and in combination with penicillin in the treatment of "sterile" cows in two *V. foetus* infected herds.

Herd C.—This herd was free from brucellosis. An outbreak of vibriosis occurred in the fall of 1948. Diagnosis was based on the isolation of *V. foetus* from 4 fetuses and agglutination tests made on blood samples from the entire herd. About six months after the occurrence of vibrionic abortion, the owner reported that a group of 6 cows had been "bred many times" without conceptions. Three of these animals were treated by placing 1 Gm. of streptomycin and 200,000 units of penicillin in 20 ml. of a commercial water-in-oil emulsion directly into the uterus with the aid of a standard glass inseminating catheter. Three other animals were left as controls.

Treated Group.—Cow 1 calved normally in September, 1948. She was bred four times without conceiving, twice naturally and twice artificially. Treatment was administered on April 8, 1949, during heat. She was bred artificially on April 30 and conceived from this service.

Cow 2 calved normally in September, 1948. She was bred once and apparently conceived, but returned to heat after about sixty days. She failed to conceive on five subsequent services. Treatment was administered on June 11, 1949, during heat. She conceived following natural service on June 30.

Cow 3 calved normally and was subsequently bred four times by 2 different bulls without conceiving. She was treated while in heat and conceived when bred during the following heat.

Control Group.—Cow 1 calved normally in August, 1948, and had been bred six times (3 naturally, 3 artificially). She conceived on the third subsequent service without treatment.

Cow 2 calved normally in October, 1948, and had been bred twice without conceiving. She conceived on the third subsequent service without treatment.

Cow 3 calved normally in September, 1948, and had failed to conceive after four services. She was bred four additional times without conceiving and was slaughtered. Treatment was not attempted before slaughtering because of the owner's desire to cull her from the herd.

Herd M.—The history of herd M was similar to that of herd C. Two cows were selected for treatment. One had been bred three times and one six times without conceiving. Streptomycin, 1 Gm. in 15 ml. of sterile water, was placed in the uterus of each cow four days preceding heat. Both cows conceived when bred on the following heat.

DISCUSSION

The results obtained indicate that intrauterine infusions of streptomycin may assist in overcoming sterility associated with vibriosis. As a further aid in the control of vibriosis, the writers suggest artificial breeding with the addition of 500 μg. of streptomycin to each milliliter of diluted bull semen.—*H. L. Easterbrooks, D.V.M., and W. N. Plastridge, Ph.D., Department of Animal Diseases, Storrs Agricultural Experiment Station, University of Connecticut, Storrs.*

In the dog, as in man, the patella does not aid knee movement. Instead, both rapidity of movement and power of the knee joint may be increased after the patella has been removed. In the dog, there is no noticeable lameness or change from the normal.—*R. L. Rudy, D.V.M., Ohio.*

Mature understanding of pathology is more commanding in surgery than is the best workmanship.

This work was supported in part by funds provided for regional research by the Research and Marketing Act of 1946.

*Streptomycin used in this investigation was furnished by Merck and Co., Inc., Rahway, N.J.

Fracture Fixation in a Heifer

A complete compound fracture of the right metatarsus extending to the external side of the leg, was reduced by restraining the animal, pulling the distal portion into line, and applying wood splints to the four faces of the leg. The splints were applied in sequence (front, rear, lateral, medial) and each was held in place by gauze well painted with sodium silicate (water glass). No weight was carried on the leg for two weeks, but the heifer made an uneventful recovery.—*Canad. J. Comp. Med. and Vet. Sci., July, 1950.*

Cardiac Disease in Dogs

Veterinary cardiology has been neglected because the animal with a diseased heart is usually an unsound financial risk and is destroyed rather than treated.

The dependable signs of heart disease are: (1) auricular fibrillation or flutter; (2) heart block; (3) pulsus alternans; (4) pericardial friction rub; (5) diastolic murmur; (6) thrill over the cardiac region; (7) generalized engorgement of the veins; (8) severe anemia; (9) protodiastolic gallop rhythm; (10) certain electrocardiographic changes; and (11) definite cardiac enlargement.

Frequently, dogs with cardiac disturbance will show also: (1) systolic murmur; (2) dyspnea; (3) cough; (4) edema; and (5) ease of fatigability or weakness. However, these may often be present in the absence of heart disease.

In making a general examination when heart disease is suspected, there should be a careful examination of the general appearance; the pulse should be tested and the thorax, abdomen, and extremities examined. Examination of the heart itself should include inspection of the cardiac region on both sides of the chest, palpation of these areas, percussion of the same portions of the thorax, and auscultation of four specific areas—the mitral, aortic, pulmonic, and tricuspid. A fluoroscopic examination permits study of the position, size, form, and movement of the heart. The electrocardiogram can supplement the physical examination and the history. The phonocardiograph optically records the sound vibrations of the beating heart. Cardiac catheterization is one of the relatively new techniques used.

Many of these instruments and procedures are expensive and time-consuming, but they do permit a more careful study of the subject of veterinary cardiology.—*D. K. Detweiler, D.V.M. (Pennsylvania), at the Nineteenth Annual Conference for Veterinarians, Columbus, Ohio, June, 1950.*

Delayed Breeding in Dairy Cattle

Sterility is not a disease but a symptom which accompanies many diseases. Three important facts must be considered in a study of infertility: (1) Each individual cow is a separate case; (2) early treatment is important; and (3) means of prevention must be started. Losses in time, value of products, and decreased value of stock average about $10 per dairy cow per year in New York State, or a total of $20 million each year.—*S. A. Asdell, Cornell Extension Bulletin 737, June, 1948.*

Notes on Sterility*

Mammalian Aspects of Infertility.—High environmental temperatures reduce fertility in male rabbits. Continuous heat is more detrimental to fertility than intermittent high and low temperatures.—*Mohamed M. Oloufa, R. Bogart, and F. F. McKenzie, Corvallis, Ore.*

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Permeability of the Vaginal Wall.—Permeability of the vaginal wall of the rabbit is unidirectional. This is shown by ready absorption of such diverse substances as salts, sugars, proteins, dyes, alkaloids, chemotherapeutic agents, and antibiotic agents, when these are placed in the lumen of the vagina; but they failed to appear, or appeared in minimal amount only, when these same substances were administered or injected in other parts of the body.—*C. G. Hartman, N. Millman, J. Stavorski, and J. Botti, Raritan, N. J.*

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Ovulated cow ova could not be fertilized *in vitro.*—*R. C. Umbaugh, San Antonio, Texas.*

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Abnormal Sperm Morphology.—Morphologically, the percentage of abnoral spermatozoa found in the original ejaculate is far greater than those surviving in the

*Notes from the Sixth Annual Conference of the American Society for the Study of Sterility, San Francisco, June 24-25, 1950.

female at the time of ovulation.—*M. R. Cohen and I. F. Stein, Chicago, Ill.*

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Spermacidal Bacteria.—Cultures of the colon bacillus and of the viridans streptococci were spermacidal, while cultures of hemolytic and nonhemolytic staphylococci, *Bacillus subtilis*, and other less common organisms were not.—*C. L. Buxton and C. Matthews, New York, N. Y.*

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"Total-Push" Therapy.—Functional gonadal failure frequently responds to "total-push" therapy. The term implies a mobilization of all the metabolic, endocrine, nutritional, and psychological factors which can stimulate gametogenesis.—*S. J. Glass, Los Angeles, Calif.*

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Clinical Evaluation of Semen.—Low density is correlated with poor motility and poor morphology. Together, they spell low fertility.—*E. W. Page and Florence Houlding, Berkeley, Calif.*

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Judging Semen Quality.—Motility, especially in the lower count classifications, is a factor to be emphasized in estimating fertility.—*John MacLeod, New York, N. Y.*

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Hereditary Forms of Sterility.—Swedish statistics on cattle breeding point to the possibility of hereditary predisposition to the multiglandular syndromes associated with cystic ovaries and adrenal virilism, and which lead to nymphomania.—*Nils Lagerlöf, Stockholm, Sweden.*

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Factors in Prognosis.—Two important factors which influence prognosis in cystic ovaries and the associated syndrome are presence of normal receptive tissue within the remaining follicles of the ovary, and the activity and equilibrium of the autonomic system.—*H. E. Kingman, Cheyenne, Wyo.*

Prolapsed rectum of the pig or other young animals may be handled by inserting into the everted gut a test tube or a gelatin capsule. The outer and inner layers of everted gut may then be sutured using a continuous suture and pulling the stitches reasonably snug. If a gelatin capsule is used, it may be left in place and will dissolve as moisture comes in contact with the gelatin. This same type of treatment may be used when making an intestinal anastomosis.—*W. M. Coffee, D.V.M., Kentucky.*

Lowered Fertility in Clinically Normal Cows

It has been estimated that breeding troubles and lowered fertility of cattle cause a loss of $10 per cow per year in butterfat production alone. This means that in a state like New York, with slightly more than 2 million cattle, the annual loss from infertility is more than $20 million, while in Wisconsin with its 3.75 million cattle, the figure will be $37.5 million.

Optimum fertility is based on the assumption that the dairy cow should produce a calf every twelve months. It has been estimated that when this period is lengthened to thirteen months, there is a loss of 25 lb. of butterfat per cow.

The figures on artificial insemination indicate that 60 per cent of the cows conceive on first service, and of the 40 per cent which do not settle at that time, one half, or 20 per cent of the total cows, require three to ten or more services.

If 100 repeat-breeder cows are selected, 38 of these might be expected to settle successfully on the fourth insemination without any treatment whatever. This complicates the analysis and evaluation of the results of treatment of the hard-to-settle cows. Few cows are sterile; most of them suffer only from a reduced fertility. Cows hard to settle at one time may settle very easily at the next breeding period, and a cow which settles on the first breeding one year may be a repeat-breeder the following year. Therefore, nothing will be gained if one sells the repeat-breeder cows.

CAUSE OF REPEAT BREEDING

Ovulation failure was not a cause of repeat breeding in a Wisconsin survey. Failure of fertilization was a cause, but embryonic death was the main cause of the condition. Operators of bull studs often employ semen of another breed in the hard-to-settle cows. That is, a Guernsey cow repeatedly bred to a Guernsey bull without success often settles when inseminated with Holstein sperm.—*S. H. McNutt, D.V.M. (Wisconsin), at the Ohio Conference for Veterinarians, June 14-16, 1950.*

CLINICAL DATA

Clinical Notes

Many vegetable oils may be considerably richer in vitamin E content than wheat germ oil.—*J. Nutr., March 10, 1950.*

Castration will practically always prevent a recurrence of a perineal hernia in the dog.—*M. W. Allam, V.M.D., Pennsylvania.*

Bird dogs "run through" their birds when the tonsils are bad. They usually recover in about three weeks after the tonsils have been removed.—*W. M. Coffee, D.V.M., Kentucky.*

Small animal hospital patients should never be confined in cages less than 1½ by 2 times the length of their body. For a Setter (2 ft. long), this means a cage not less than 3 ft. by 4 ft.—*J. A. Butterworth, D.V.M., Illinois.*

Prevention of swine diseases through quarantine, hygiene, and sanitation is a more important aspect than the treatment with sulfonamides, antibiotics, and biologic agents.—*J. D. Salisbury, D.V.M., Indiana.*

Restraint is highly important in the handling and treating of beef cattle. A rope halter is much more effective than a nose leader in most herds, and a permanent or portable chute is almost a necessity.—*F. B. Young, D.V.M., Iowa.*

Salmonella Abortus Equi.—Salmonella abortus equi is capable of causing in horses of all ages and sexes, abscesses, bursitis, poll evil, fistulous withers, purulent pneumonia, periostitis, and septicemia, in addition to abortion in mares and pyosepticemia of their foals. The prophylaxis and therapeutics are illusory, barring the role of infected stallions.

The most constant symptom of baby pig disease is atony of the gastrointestinal tract.—*L. M. Hutchings, D.V.M., Indiana.*

Sheep sprayed, or dipped, with DDT, and shorn soon after, produce a moth-proof wool.

The Brucella ring test is essentially an agglutination test and it operates similarly to the blood-serum test.—*M. H. Roepke, Ph.D., Minnesota.*

Veterinary medical practitioners in Michigan have used Brucella M vaccine in brucellosis-free herds to retain a degree of resistance, without inducing reactions which would remove the herd from the brucellosis-free list.—*B. J. Killham, D.V.M., Michigan.*

Intravenous injection of 10 per cent aqueous solution of formalin is reported to give important results in contagious pleuropneumonia of goats.—*From Bull. Agric., Congo Belge.*

Periovarian Adhesions.—In a study of 1,644 abattoir carcasses, Thygensen (*Maaned.f.Dyrlgr., 60,* 1949) found adhesions in the region of the ovaries in 142. Of these, 33 were bilateral, 77 right, and 32 left. Sterility was complete in 32 of the bilateral cases. As to cause, endometritis, abdominal tuberculosis, irritant intrauterine injections, and harsh handling per rectum were indicated.

Says the *Journal of the American Medical Association* editorially, "Antihistaminic drugs for colds continue to burst on the medical world and general public before the statistician is convinced that enough data have been collected." Warning against "bursting enthusiasm" over every new drug is conventional behavior also in our niche of the realm.

Aureomycin in the Treatment of Bovine Mastitis

L. W. SLANETZ, Ph.D., and F. E. ALLEN, D.V.M.

Durham, New Hampshire

WHILE PENICILLIN is highly effective for the treatment of streptococcic mastitis, certain cases of the long-standing, chronic type do not respond to treatment with this antibiotic. Furthermore, a number of investigators[1-5] have reported that penicillin therapy in staphylococcic mastitis has been successful in only 20 to 75 per cent of the cases treated. Schalm and Ormsbee[5] concluded that penicillin therapy of staphylococcic mammary infection in lactating quarters did not produce a sufficiently high level of cures to warrant its use, except for quarters in which gross symptoms of mastitis appear. These investigators did obtain more satisfactory results when the penicillin was administered during the dry period but even then about 30 per cent of the quarters did not respond to treatment.

Thus, it has been of interest to test other agents for the treatment of bovine mastitis. We have tested the value of sulfamethazine combined with penicillin for the treatment of streptococcic and staphylococcic mastitis. Preliminary experiments had indicated that such a combination might prove effective. However, further studies revealed that in 162 infected quarters infused with 10 Gm. of sulfamethazine and 100,000 to 200,000 units of penicillin, the percentage of recoveries was not increased appreciably over that obtained with penicillin alone. Schalm *et al.*[9] also report that sulfamethazine is ineffective for the treatment of infection of the mammary gland caused by *Staphylococcus aureus*.

The present paper reports the results obtained with aureomycin in the treatment of streptococcic and staphylococcic mastitis. To date, only one paper[10] has appeared in the literature on the use of this antibiotic for treatment of bovine mastitis. This paper reported 85.7 per cent recoveries of 14 quarters with staphylococcic mastitis when tested twenty-one days after treatment of each quarter with 200 mg. of aureomycin in an ointment base.

From the University of New Hampshire Agricultural Experiment Station, Durham.

METHODS

Experimental Herds.—The animals used for this study were in five privately owned dairy herds and included grade and pureberd Holstein-Friesian, Guernsey, Ayrshire, and Jersey cows. For two of the herds, one containing 60 and the other 150 milking cows, records of mastitis infection were available over a six-year period. During this period, milk samples were collected at monthly intervals and tested for mastitis by microscopic and cultural tests of incubated samples. The other three herds selected for this study were so-called problem herds with a high incidence of mastitis infection of both the chronic and acute types.

Laboratory Procedures.—Before treatment, two or more tests at one-week intervals were made on quarter samples collected aseptically into 30-ml., screw-capped, flat-bottomed vials. Presence of streptococcic infection was based on microscopic examination of samples incubated for about twenty hours and on cultural tests. Stained films were examined for streptococci and records were made of the leucocyte count per 1 ml. of milk. All samples showing streptococci were cultured on a modified Edwards' medium[11] and the streptococci isolated from this medium were further identified by use of selected biochemical tests.

For the determination of staphylococcic mastitis, films of incubated samples were examined for staphylococci and leucocyte counts. One loopful (4 mm.) of each incubated sample was also streaked on tryptose-glucose agar containing 5 per cent sheep blood. This method was found to be more effective than plating out 1:10 dilutions of the unincubated samples. Schalm and Ormsbee[5] have reported similar findings. The blood plates were examined after incubation at 35 C. for forty-eight hours. Samples containing hemolytic staphylococci and 1,000,000 or more leucocytes per 1 ml. of milk were considered positive for staphylococcic mastitis. All hemolytic staphylococci were isolated and tested for their ability to coagulate rabbit and sheep plasma. Only those quarters which showed a leucocyte count of 1,000,000 or more per milliliter of milk, and a continual staphylococcic infection for at least six months, were included in the treatment studies. Tests were made on each cow at one-month intervals.

Aureomycin Therapy.—The aureomycin was

[*]The aureomycin used in this study was supplied

incorporated in a special ointment and packaged in ready-to-use tin tubes each containing 200 mg. of the aureomycin. The tube contained a rolled-in-tip and, after removing the screw cap, the tip could be inserted directly into the teat canal and the contents infused into the udder by pressing the tube.

TABLE 1—Results of Treatment of Streptococcic Mastitis with Aureomycin Ointment

Treatment	Quarters treated (No.)	Quarters freed of infection (No.)	(%)
1 infusion of 200 mg. of aureomycin per quarter	230	212	92.3
1 infusion of 400 mg. of aureomycin per quarter	57*	54	95.0
3 infusions, 200 mg. per quarter given at 48-hr. intervals	22**	22	100

*Twelve quarters treated in this group remained infected after treatment with 200 mg. of aureomycin.
**All of the 22 quarters in this group retained mastitis streptococci following infusion of 200 mg. or 400 mg. of aureomycin into each quarter. All of these cows had a long-standing, chronic infection for at least three to four years and many were giving discolored or stringy milk. Eighteen of these quarters had not responded to penicillin even when large and repeated doses were administered.

The aureomycin ointment was infused into the udder after the quarter had been milked out, care being taken to massage the udder following the infusion. In this study, the infected quarters were treated with either a single infusion of 200 mg. or of 400 mg. of aureomycin or with three infusions of 200 mg. per quarter given at 48-hour intervals. In all cases, the cows were milked out approximately twelve hours following treatment.

Methods for Determining the Therapeutic Value of Aureomycin.—Cows with streptococcic mastitis were considered freed from infection when no mastitis streptococci could be detected in films made from incubated samples and no streptococci developed on Edwards' medium streaked with 1 loopful (4 mm.) of the incubated sample. Quarters infected with mastitis staphylococci were considered freed from infection when no hemolytic staphylococci were found on sheep blood-agar plates streaked with 1 loopful (4 mm.) of an incubated sample. No quarter was classed as freed from infection unless the organisms were absent in the samples for at least two months following treatment. Samples were collected two weeks, one month, and two months following treatment. The cows in some of the experimental herds have been tested at monthly intervals over a twelve-month period after treatment.

RESULTS

Treatment of Streptococcic Mastitis.—The results obtained following the treatment of 230 quarters infected with mastitis streptococci, each with one infusion of 200 mg. of aureomycin, are recorded in table 1. Before treatment, *Streptococcus agalactiae* was isolated from 223 of the quarters, *Streptococcus uberis* from four quarters, and *Streptococcus fecalis* from three quarters. The infection was eliminated in 212 (92.3%) of the quarters.

Of 57 streptococcic-infected quarters given one infusion of 400 mg. of aureomycin, one was infected with *Str. uberis* and the remaining 56 quarters with *Str. agalactiae*. Of these, 54 (95%) were freed of the infection. As indicated in the footnote in table 1, 12 of the quarters treated in this group were cases that remained infected after treatment with 200 mg. of aureomycin.

Twenty-two quarters with streptococcic mastitis were treated with three infusions of aureomycin, injecting 200 mg. into each quarter at 48-hour intervals. One of these quarters had a *Str. uberis* infection and the remainder were infected with *Str. agalactiae*. All 22 quarters were freed of infection. Aureomycin assays of the milk indicated that high inhibitory concentrations were present for at least forty-eight hours, even when the cow was milked at 12-hour intervals during that period. As is noted in a second footnote in table 1, all 22 quarters in this group had failed to respond to treatment with a single infusion of either 200 or 400 mg. of aureomycin. These cows had a long-standing, chronic infection over a period of at least three to four years and had histories of periodically producing discolored or stringy milk. Of these quarters, 18 had been previously treated with large and repeated doses of penicillin (400,000 U. per infusion) without eliminating the infection. These are

TABLE 2—Results of Treatment of Staphylococcic Mastitis with Aureomycin Ointment

Treatment	Quarters treated (No.)	Quarters freed of infection (No.)	(%)
1 infusion of 200 mg. of aureomycin per quarter	43	24	55.8
1 infusion of 400 mg. of aureomycin	23	11	47.8
3 infusions, 200 mg. per quarter given at 48-hr. intervals	26	25	96.1

*The aureomycin used in this study was supplied through the courtesy of Lederle Laboratories, Pearl River, N. Y.

good examples of cows which were heretofore considered incurable and the success in eliminating the infection with aureomycin has been surprising.

It should be noted that no attempt was made to select cows for treatment in any of the five experimental herds. All cows with streptococcic mastitis were treated. As has been previously indicated, many of the cows had a long-standing, chronic infection and some were producing discolored or stringy milk. No cows with highly inflamed or swollen udders were included in the treatment group. Some of the quarters treated with a single infusion of 200 or 400 mg. of aureomycin were negative two weeks and one month after treatment but then showed infection at the time of the two-month sampling period. These cases were considered unrecovered, but a reinfection may have occurred in some instances. As long as cows with streptococcic mastitis remained in the herd, a considerable number of new infections continued to occur in the herds. This emphasizes the need for good herd management and sanitation in any control program. At the present time, infection due to mastitis streptococci has been eliminated completely in two of the five experimental herds without removing any cows from the herds.

Treatment of Staphylococcic Mastitis.—The results obtained in the treatment of staphyloccocic mastitis with aureomycin are given in table 2. Of 43 quarters infected with hemolytic staphylococci, and given one infusion of 200 mg. of aureomycin per quarter, 24 (55.8%) were freed from mastitis staphylococci. When 23 quarters were treated with one infusion of 400 mg. per quarter, 11 (47.8%) of them were cured. When 26 infected quarters were treated with three infusions of aureomycin, administering 200 mg. per quarter at 48-hour intervals, 25 (96.1%) of them were free from mastitis staphylococci following this treatment. It should be noted that, generally, clinical recovery occurred, and the leucocyte counts were completely or markedly reduced following treatment even though the staphylococci were not eliminated.

As was previously noted, only quarters which showed a continual staphylococcic infection for at least six months were treated during the above study. In some cases, infection with mastitis staphylococci may be transient, the organisms disappearing from the udder without treatment. Schalm and Ormsbee[8] have made similar observations. However, all cows included in the treated group were considered to have a permanent or chronic infection. Some of the quarters were producing discolored milk. All except 5 of the 92 strains of staphylococci isolated from the infected quarters were coagulase positive.

The results obtained following one infusion of 200 or 400 mg. were not as favorable as those previously reported.[10] However, it should be noted that these workers based their recoveries on a reduction in numbers of staphylococci in unincubated milk samples and not on the complete absence of the organisms in incubated samples, as was the case in our studies.

The elimination of staphylococcic infection when three infusions of aureomycin were given was highly satisfactory. However, treatment studies on a much larger number of quarters should be made before final conclusions are drawn. No evidence of irritation or toxicity due to the aureomycin could be detected in any of the treated cows nor was any appreciable reduction in milk production observed. The milk from some of the cows did have a yellow to gold color for twelve to twenty-four hours after administration of the antibiotic.

SUMMARY

Aureomycin, in an ointment base, was found to be the most effective agent so far tested by the authors for the treatment of streptococcic and staphylococcic mastitis.

The following results were obtained in the treatment of streptococcic mastitis: one infusion of 200 mg. of aureomycin per quarter eliminated the infection in 212 (92.3%) of 230 quarters so treated; one infusion of 400 mg. eliminated the infection in 54 (95%) of 57 quarters so treated; and three infusions of 200 mg. per quarter, administered at 48-hour intervals, freed from infection all 22 (100%) of infected quarters so treated. Particularly significant is the fact that all 22 quarters in the last group were cases of long-standing, chronic infection and all had histories of producing discolored or stringy milk. Of these quarters, 18 had previously failed to respond when treated with large and repeated doses of penicillin. At the time of

treatment, none of the cases had highly swollen or inflamed quarters.

For the treatment of staphylococcic mastitis, one infusion of 200 or 400 mg. freed from infection 47 to 55 per cent of the infected quarters treated. However, Staphylococcus infection was eliminated in 25 (96.1%) of 26 quarters given three infusions of aureomycin, administering 200 mg. per quarter at 48-hour intervals. Every cow in the treatment group had a well-established or chronic infection. Thus, treatment of staphylococcic mastitis with aureomycin appears highly promising, but further treatment studies are necessary before final conclusions are drawn.

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Metabolic disturbances in ruminants often hark back to deficient roughage.—*J. N. Campbell, D.V.M., Minnesota.*

Range Herd Brucellosis Control

Naturally, a good operator strives to have top quality cattle and a high calving percentage, and he endeavors to get the best economical growth on the young animals as well as to keep the herd free of contagious diseases.

• • •

The disease problem in cattle has been gradually increasing.

• • •

Brucellosis, one of the older diseases, has been a bad one to combat but seems now to be well on the way to being controlled or prevented, even though some of the doctors of veterinary medicine do not agree on the method of control.

• • •

Brucellosis has been the most costly to us of any of the livestock diseases.

• • •

We developed a method of branding the cattle the first time they were tested, in order to eliminate putting them through the chute again to check ear tags when locating reactors.

To summarize the methods of control we used in freeing our herd of brucellosis: The disease in the adult herd was reduced to a minimum by testing and slaughter; calf vaccination was instituted in the replacement heifers; conscientious observation of sanitary methods, especially in the isolation of any reactors or suspected animals where a cow showed signs of an abortion; the destruction of all aborted calves; the strict rule that any animals added to the herd must be tested and negative or vaccinated. Ample feed of good quality goes far in the prevention of brucellosis as well as any other disease.—*Excerpts from "Experiences in Controlling Brucellosis in Cattle in a Range Herd," by Herman Oliver and John Day (Oregon), U. S. Livestock Sanitary Association meeting, Oct.* 12-14, 1949.

A convenient way to handle cats in the small animal hospital is to provide a screen for them to hang on while work is being done. This often stops them from scratching or clawing the operator. Another good method of restraint is to put them in a cat bag which controls the legs while leaving other portions of the body exposed. —*R. J. Beamer, D.V.M., Iowa.*

Effects of Aureomycin on Staphylococcus Pyogenes in the Bovine Mammary Gland

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THIS INVESTIGATION was conducted in a single dairy herd of about 250 Holstein-Friesian cows which has been under continuous observation by the writer for seven years. *Streptococcus agalactiae* was eliminated between 1943 and 1945 and data accumulated between 1944 and 1948 on *Staphylococcus pyogenes* mammary infections were published recently.[1]

Milk samples for bacteriologic study have been drawn weekly since the study was initiated. An attempt has been made to sample every cow in the herd, both lactating and dry, at least once every six weeks. When *Staph. pyogenes* was found in a sample for the first time, individual quarter samples were drawn the following week from the animal concerned. A cow was classified as infected with *Staph. pyogenes* when the pathogen was found on two consecutive tests. The infected cows were segregated and regularly milked last.

Intramammary therapy directed against *Staph. pyogenes* in lactating quarters did not produce satisfactory results despite the use of a variety of agents, whereas therapy with penicillin in infected dry quarters has been more promising.[1] However, as new therapeutic agents became available, they were regularly tried first on *Staph. pyogenes* infections in lactating quarters. Thus, when aureomycin became available, a trial was initiated in this herd, principally in lactating quarters.

McCulloch, Kiser, and Migaki[2] reported that two injections of 200 mg. of aureomycin in 7.5 Gm. of ointment base given seventy-two hours apart produced a response which they interpreted as evidence of an "apparent cure" in 12 of 14 quarters infected with staphylococci. In their study, the milk was not incubated (Hotis test) prior to plating and the presence of pathogenic staphylococci not to exceed 150 per 1 ml. of milk was tolerated within their classification of "apparent cure." Four of the 12 quarters designated by them as "cured" were shedding a limited number of pathogenic staphylococci on the twenty-first day after treatment. Complete absence of pathogenic staphylococci at that time was limited to eight of the 14 treated quarters (57.1%). Retention of aureomycin in the udder was regarded by McCulloch *et al.* as excellent, for it was stated that "200 mg. of aureomycin per quarter in 7.5 grams of ointment base gave exceedingly high milk concentration at 72 hours after treatment, even though the quarters had been milked out six times during that period."

In the investigation providing the data for the current report, the milk samples were drawn in a manner designed to preclude contamination with bacteria from sources outside the udder.[3] The samples were incubated for sixteen to twenty hours at 37 C. (Hotis test), and then a loopful (2 mm.) was streaked on half of the surface of a tryptose-agar plate containing freshly washed, cow erythrocytes. Following treatment, samples were drawn usually at weekly intervals for eight weeks. A quarter was regarded as still infected when one or more colonies of toxicogenic, coagulase-positive staphylococci developed during incubation of the streaked plate. This is a very rigid test but our experience with staphylococcic mammary infections in this herd has proved to us that in most instances the shedding of a minimal number of organisms following therapy indicates that the infection has not been overcome. In such cases, subsequent samples have usually contained the pathogen again in

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Appreciation is expressed to Martin J. Foley, dairyman, and Hazel C. Drew, senior laboratory technician, for assistance in this investigation.

Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y., supplied the aureomycin in collapsible tubes fitted with a protected teat cannula. Each tube contained 200 mg. of aureomycin in 7.5 Gm. of ointment base.

numbers comparable to pretreatment levels.

TREATMENTS AND RESULTS

Trial 1.—Eight cows, having given birth to 2 to 8 calves each and having a total of 12 quarters that had shed *Staph. pyogenes* from one to forty-eight months, were treated with 400 mg. of aureomycin given in two doses of 200 mg. each. One quarter received the doses of aureomycin twenty-four hours apart; in the remaining quarters, forty-eight hours elapsed between doses. Eight of the quarters were lactating and four were dry. Five of the quarters had failed to respond successfully to previous treatments with other therapeutic agents.* *Staphylococcus pyogenes* was eliminated from only two quarters by the aureomycin. Of the ten quarters that were shedding the pathogen subsequent to treatment, one was negative the first week, positive the second week, then negative for three weeks, and then positive again in the sixth, seventh, and eighth weeks; three quarters were negative the first week but positive thereafter; one quarter was negative for two weeks and positive thereafter; and, finally, one quarter was negative for three weeks but positive thereafter.

Trial 2.—Eight cows, having given birth to 1 to 7 calves each and having a total of ten quarters that had shed *Staph. pyogenes* from seven to twenty-four months, were treated with 800 mg. of aureomycin given in four doses of 200 mg. each. Two quarters on a cow milked at eight-hour intervals received the four doses alternately at eight and sixteen hours apart; with the remainder of the quarters, twenty-four hours elapsed between administration of doses. Nine of the quarters were lactating and one was dry. Eight of the quarters had been treated previously with other therapeutic agents.* *Staphylococcus pyogenes* disappeared from one dry and three lactating quarters following the aureomycin administrations. Of the six quarters that shed *Staph. pyogenes* after treatment, one remained negative for three weeks and then was positive on subsequent tests, whereas five quarters were negative during the first week only and positive thereafter.

Trial 3.—Six cows, having given birth to 2 to 6 calves each and having a total of 11 quarters that had shed *Staph. pyogenes* from one to thirteen months, were treated with 1,600 mg. of aureomycin given in eight doses of 200 mg. each. One quarter on a cow milked at eight-hour intervals received the aureomycin alternately at eight- and sixteen-hour intervals; with the remainder, the doses were spaced twenty-four hours apart. Nine of the quarters were lactating and two were dry. Five quarters had been treated previously with other therapeutic agents.* Following aureomycin administration, one dry and two lactating quarters were freed of *Staph. pyogenes*. Among the eight quarters that shed this organism again after treatment, one was negative for three weeks, two were negative for two weeks, and three quarters were negative for one week after treatment; whereas the remaining quarter was shedding again within the first week following the aureomycin administration.

Retreatment Trial.—Ten lactating quarters that continued to shed *Staph. pyogenes* following the initial treatment with aureomycin were retreated with a total of 1,600 mg. given in eight doses of 200 mg. each spaced twenty-four hours apart. Among six quarters previously failing to respond successfully following a total of 400 mg. of aureomycin, two responded to retreatment; and of four quarters, in which the infection was not eliminated following a total of 800 mg., two responded upon retreatment with 1,600 mg.

Miscellaneous Trials.—In addition to treatment of *Staph. pyogenes* mammary infections, one quarter which had been shedding coliform organisms, both *Aerobacter aerogenes* and *Escherichia coli*, for thirty months failed to respond successfully following exposure to 400 mg. of aureomycin given in two doses of 200 mg. each, administered forty-eight hours apart. *Pseudomonas aeruginosa* had been present in three quarters on 2 cows for forty-six, eleven, and nine months, respectively. All continued to shed the pathogen after treatment. Two quarters were given 1,600 mg. each, administered in eight doses twenty-four hours apart, and one quarter received 400 mg. administered in two doses forty-eight hours apart.

*Sulfamethazine, combined oral and intravenous administration; penicillin; and streptomycin or dihydrostreptomycin (1), (4), (5).

DISCUSSION

The 33 bovine quarters infected with *Staph. pyogenes* and treated with aureomycin in these trials were not regarded as unusual infections, except that in 18 of them the infection was not eliminated on previous treatments with other therapeutic agents. Quarters similarly infected exist in many of the dairy herds that have come under our observation during the past decade. *Staphylococcus pyogenes* may be shed in the milk of specific quarters over a period of months with little or no frank evidence of abnormality in the milk. However, more critical examination of the milk usually revealed intermittent changes in hydrogen ion concentration, fluctuation in leucocyte number and a tendency toward chloride levels near or above the maximum normal level. Occasionally, a *Staph. pyogenes*-infected quarter developed a palpable swelling which receded in a few days, especially when infused with penicillin or, more rarely, advanced into a fulminating case of mastitis with or without the development of gangrene.

In the herd involved in this report, only 1 case of gangrenous mastitis attributable to *Staph. pyogenes* infection occurred in the seven years during which the herd was observed closely. Several fulminating, nongangrenous cases have developed. In general, the *Staph. pyogenes* infections dealt with in this study have been so-called "shedder cases" with only an occasional quarter exhibiting intermittent mild or persistent chronic clinical symptoms.

The failure of aureomycin to produce a high rate of recovery among the quarters treated may, to some extent, be related to inclusion in the group of 18 quarters that had previously failed to respond successfully when treated with other therapeutic agents. Among 15 quarters that had not previously been treated with any other therapeutic agents, six (40.0%) ceased to shed *Staph. pyogenes* upon initial treatment with aureomycin, whereas among the 18 quarters that had not responded to previous treatments with other therapeutic agents, only three (16.6%) responded favorably to aureomycin treatment. That failure to recover was not related to duration of infection is demonstrated by the following: 12 of the 33 quarters had been infected for six months or less and only two of these (16.6%) were freed of infection following aureomycin injections; whereas among 21 quarters that had been infected from seven to forty-eight months, seven (33.3%) ceased to shed the pathogen after aureomycin administration.

SUMMARY

Twelve quarters infected with *Staphyloccus pyogenes* were treated with 400 mg. of aureomycin administered in two doses of 200 mg. each, either twelve or twenty-four hours apart. Two quarters (16.6%) became negative following treatment. Ten quarters, similarly infected, were treated with 800 mg. of aureomycin given in four doses of 200 mg. each, spaced twenty-four hours apart or, in the case of a cow milked three times daily, the doses were administered at alternating eight- and sixteen-hour intervals. In this group, four quarters (40.0%) became negative for *Staph. pyogenes*. Eleven were given 1,600 mg. of aureomycin administered in eight doses of 200 mg. each spaced twenty-four hours apart or, in the case of one quarter, at alternating eight- and sixteen-hour intervals *Staphylococcus pyogenes* disappeared from three of these quarters (27.2%). Of six quarters in which the infection was not eliminated following initial exposure to 400 mg. of aureomycin, two (33.3%) became negative following retreatment with a total of 1,600 mg. of aureomycin administered in eight doses at twenty-four-hour intervals; and two of four quarters that failed to respond to initial treatment with 800 mg. of aureomycin became negative for *Staph. pyogenes* on retreatment with a total of 1,600 mg. One quarter infected with coliform organisms and three quarters infected with *Pseudomonas aeruginosa* remained infected following treatment with aureomycin.

Aureomycin, as administered, did not produce results in *Staph. pyogenes* mammary infections that could be considered an improvement over results previously obtained in this same herd from penicillin infusions.

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Bacitracin in Equine Strangles

The subject was a Percheron filly that had had a severe attack of distemper which, at the time the case was brought to the writer's attention, had developed into an advanced case of strangles. There were numerous abscesses over the body, and the extremities were swollen and edematous. An unfavorable prognosis was given the owner who consented to submit the filly to a study of the parenteral therapeutic effects of bacitracin. The study was undertaken not only to establish the therapeutic value of bacitracin, when administered parenterally in cases such as the one at hand, but also for the purpose of ascertaining whether there would be any undesirable systemic reaction to the antibiotic thus administered.

Since there was no literature available concerning the use of bacitracin parenterally in animals, the dosage level was calculated on the basis of the level that had recently been applied experimentally in man. The literature[1] concerning its use in man indicated that a therapeutic dose of 200 units per kilogram of body weight (approximately 100 units per pound of body weight) had been used with gratifying results. Judging the filly to weigh about 700 lb., the dosage level, calculated on the basis of the work cited above, would be 70,000 units daily. It was decided to exceed this amount slightly and establish the dose at 100,000 units daily.

The daily established dose of 100,000 units was given in two doses of 50,000 units each at approximately twelve-hour intervals for one week. The time of administration of each dose was kept as near to schedule as possible, 8:00 a.m. and 5:00 p.m. This arrangement was not exactly ideal because of the fact that the time interval between doses was nine hours and fifteen hours, respectively. Each 50,000-unit quantity of bacitracin (Upjohn) was dissolved in 20 cc. of sterile, distilled water and injected intramuscularally in the gluteal region in amounts of 10 cc. in each of two locations.

At variously spaced intervals, blood was collected from the filly to be assayed to determine the level of concentration of bacitracin. The results of the blood level determinations are given in table 1.

TABLE 1—Bacitracin Serum Levels of Percheron Filly

Sample (No.)	Date (1950)	Bacitracin (50,000 U.) administered	Blood sample taken	Bacitracin U./cc. of serum
1	2-14	8:00 a.m.	.....	.....
2	2-14	5:00 p.m.	5:30 p.m.	0.045
3	2-15	8:00 a.m.	8:30 a.m.	0.026
4	2-15	5:00 p.m.	5:30 p.m.	0.043
5	2-16	8:00 a.m.	8:00 a.m.	0.05
6	2-16	5:00 p.m.	1:30 p.m.	0.05
7	2-17	8:00 a.m.	8:00 a.m.	0.04
8	2-17	5:00 p.m.	1:30 p.m.	0.02
9	2-18	8:00 a.m.	8:30 a.m.	0.029
10	2-18	5:00 p.m.	.....	.....
11	2-19	8:00 a.m.	.....	.....
12	2-19	5:00 p.m.	.....	.....
13	2-20	8:00 a.m.	1:30 p.m.	0.025
14	2-20	5:00 p.m.	.....	.....
15	2-21	8:00 a.m.	8:00 a.m.	0.02
16	2-21	.....	1:30 p.m.	0.05

The blood levels of bacitracin are quite significant considering the dose size (50,000) units, frequency of administration, and comparison with penicillin levels after a similar dosage of a comparable, aqueous solution injected intramuscularly.

During the course of this therapy, there were no observed toxic effects of the drug either at the site of injection or systemically.

While it was felt that the general condition of the filly was improved following the course of treatment as evidenced by an improved appetite, a decreased amount of exudate from the abscesses, and by a reduction of body temperature, a complete cure was not effected. It is felt, however, that, had the bacitracin been employed earlier and at possibly somewhat higher dosage levels, the probability of overcoming the disease would have been increased.

The postmortem examination revealed kidney and liver damage, the chronicity of which indicated the result of bacterial infection and in no way the result of bacitracin administration.—*Edward A. White, D.V.M., East Lansing, Mich.*

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Sulphone and Penicillin Separately and Combined in the Treatment of Streptococcic Mastitis

JOSEPH SIMON, M.S., D.V.M., G. R. SPENCER, D.V.M., M.S., Ph.D., MARY E. KRAFT, M.S., and MARY SCHENK, B.S.

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NUMEROUS medicaments have been developed in recent years for the treatment of mastitis caused by *Streptococcus agalactiae*. Numerous investigators have established penicillin[1,2] as the drug of choice. This choice is accentuated through the comparatively low cost of penicillin, its relative nontoxicity, and the possibility of use in a variety of vehicles for administration.

Recently, Francis,[3-6] in England, reported that sulphone, 4:4' diamino diphenyl sulphone, was efficacious against *Str. agalactiae* infection in the chicken embryo and mouse. He demonstrated the potency of sulphone* against *Streptococcus pyogenes* in mice and found it considerably more efficacious than either sulfanilamide or sulfapyridine. Sulphone was found to be toxic for man and most animals with the exception of cattle. The preliminary work indicated also that sulphone had considerable antibacterial activity against other streptococci.

These favorable reports prompted us to initiate trials with sulphone in the treatment of bovine streptococcic mastitis. The drug was available as udolac,** a 10-Gm. oil-paste mixture of sulphone in a collapsible tube.

MATERIALS AND METHODS

All of the experimental herds were in the immediate area of Madison, Wis. These herds had considerable involvement and could be classified as operating under average dairying conditions. Each herd was tested by individual quarter sampling utilizing the Hotis test, direct microscopic films, and streaking each incubated sample upon a blood-agar medium containing sodium azide, 1:10,000, and 0.5 per cent mannitol.

The infected quarters of each herd were divided into four nearly equal and comparable groups, so that each medicament was employed under similar conditions. Following treatment, each infected quarter was sampled weekly for three consecutive weeks utilizing the same procedures as in determining the original infectivity. A quarter was considered free of streptococci if it was negative to all of the consecutive post-treatment tests during the three-week test period.

EXPERIMENTS

Experiment 1.—In preliminary *in vivo* experimentation at this Station, it was revealed that there was little, if any, difference in the irritability of 4:4' diamino diphenyl sulphone, sulfanilamide, sulfamethazine, sulfamerazine, or sulfadiazine in combination with penicillin. Preliminary therapeutic trials also included disodium sulphone,† 22.5 per cent solution; sulphone powder in a mineral oil vehicle, 20 per cent weight/volume; and sulphone powder plus 50,000 units of penicillin. The results are summarized in table 1. These data suggested the possible value of sulphone in the therapy of mastitis and prompted further trials with it.

TABLE 1—Preliminary Trials of Sulphone for Streptococcic Mastitis

Drug	Dose	Quarters (No.)	Quarters freed of infection (No.)	(%)
Disodium sulphone* 22.5% Solution	4.5 Gm.	1	1	100
Disodium sulphone* 22.5% Solution	10.0 Gm.	2	1	50
Sulphone powder 20% w/vm mineral oil	10.0 Gm.	20	10	50
Sulphone powder + 50,000 U. penicillin	10.0 Gm.	17	10	59

*Diamino diphenyl sulphone, acetaldehyde bisulfite, complex disodium salt.

From the Department of Veterinary Science, University of Wisconsin.

*Where the term sulphone is used in this paper, it refers to the compound 4:4' diamino diphenyl sulphone.

**Udolac was a 33.3 per cent suspension of sulphone prepared by the Imperial Chemical Pharmaceuticals, Ltd., Manchester, England.

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†Diamino diphenyl sulphone, acetaldehyde bisulfite, complex disodium salt.

Experiment 2.—Sulphone, as udolac, was used alone or in combination as follows:

Group A, one tube of udolac (10 Gm. sulphone in oil).

Group B, one tube of udolac and 100,000 units of crystalline potassium penicillin G in 20 ml. of oil-water emulsion, penicle;†† after seventy-two hours, a second dose of 100,000 units of penicillin in 20 ml. of penicle was given.

Group C, 100,000 units of crystalline potassium penicillin G in 20 ml. of penicle, repeated in seventy-two hours.

Group D (control group), 20 ml. of penicle (oil-water vehicle) with no drugs.

TABLE 2—Therapeutic Trials of Sulphone for Streptococcic Mastitis

Group	Quarters treated (No.)	Quarters freed of infection (No.)	(%)
A Udolac (sulphone)	68	48	71
B Udolac — penicillin	70	56	80
C Penicillin	68	59	87
D Control	66	19	29

Physical examinations of the treated quarters were made seventy-two hours after the first treatment and one week after the second treatment, to determine the degree and severity of inflammatory response. The results of this experiment are recorded in table 2.

The udolac was moderately irritating; however, no serious damage was detected and none of the udolac-treated quarters ceased to lactate. Firm, extensive swellings and thickened milk were noted in the first and second and, in some cases, to the fourth milking following treatment. A sequel of the toxicity of sulphone was the convulsions or death of several cats on one farm where the herdsman had not been warned as to the proper disposal of the milk of treated quarters. Francis had reported high toxicity of sulphone for several species other than cattle.

Statistical evaluation of the results showed that penicillin was more efficacious than sulphone, and that there was not significant difference in effects between penicillin and penicillin in combination with sulphone.

Experiment 3.—Since the commercial preparation, udolac, showed therapeutic activity against *Str. agalactiae*, additional formulations were prepared in attempts to enhance the efficacy and reduce the irritating action. The possible advantages of a more uniform and smaller particle size of sulphone was investigated. The Dupont Company supplied new formulations, with more uniform particles, averaging 2 μ in size.

The treatments were as follows:

Group A, 43.6 ml. of 25 per cent sulphone in mineral oil.

Group B, 32.9 ml. of 30 per cent sulphone in peanut oil.

Group C, 43.6 ml. of 25 per cent sulphone in mineral oil plus procaine penicillin, 139,000 units.

Group D (control group), 20 ml. of sterile mineral oil.

Since the concentration of sulphone and the specific gravity of the vehicle varied, different volumes were used to provide a 10-Gm. dose of the sulphone. The infected quarters were treated once and, as in experiment 2, three consecutive weekly tests were made after treatment.

TABLE 3—Therapeutic Trials of Sulphone or Sulphone and Penicillin on Streptococcic Infection

Treatment	Quarters treated (No.)	Quarters freed of infection (No.)	(%)
43.6 ml. of 25% sulphone, mineral oil	87	43	49
32.9 ml. of 30% sulphone, peanut oil	89	38	43
43.6 ml. of 25% sulphone, mineral oil, 139,000 units procaine penicillin	82	42	51
Mineral oil, 20 ml.	81	27	33

The results of this experiment are shown in table 3. No significant difference was found in the efficacy of the three formulations. Addition of penicillin to sulphone did not improve its efficacy in these trials.

The formulations of sulphone as used in experiment 3 were similar to udolac in their irritability to the mammary gland. As far as could be determined by questioning herdsmen and examination of the treated quarters, the amount of swelling and the production of abnormal milk was somewhat less than from udolac.

DISCUSSION

The results of therapy against *Str. aga-*

††Penicle is a commercial oil-water emulsion used as the vehicle for penicillin.

lactiae, according to the methods utilized in this experiment, indicate that two doses of penicillin in an oil-water vehicle were more efficacious in treatment than sulphone. Sulphone and penicillin in combination did not manifest a greater therapeutic activity than penicillin alone.

The udolac ointment contained sulphone particles of marked variability in size and shape. Efforts to determine whether these factors may have contributed to the irritability of the drug failed to clarify the problem.

A number of additional sulphone formulations, of small particle size, averaging 2 μ, showed therapeutic activity similar to udolac in *Str. agalactiae* mastitis. These formulations produced some degree of irritation to the mammary gland, although of less severity than that from udolac paste. The percentage of recoveries was somewhat less than in experiment 2. The difference might be accounted for by a greater evidence of reinfection in the third experiment, since it was conducted during the harvest season when the dairymen were less careful in their sanitary precautions.

SUMMARY

1) Definite therapeutic activity *in vivo* was manifested against *Streptococcus agalactiae* by 4:4' diamino diphenyl sulphone, although it was not as effective as two doses of penicillin in an oil-water vehicle.

2) Sulphone in the form of udolac was irritating to the mammary gland.

3) Sulphone was toxic for cats which consumed milk from treated cows.

4) Other sulphone formulations showed moderate therapeutic activity but still were irritating to the udder.

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Rheumatoid Disease in Swine

A rheumatoid disease of swine produces joint and skin manifestations, heart lesions, and some other visceral changes. All of these are similar to rheumatic and rheumatoid conditions in human beings. The occurrence and recurrence of the disease is quite unpredictable, and the damage done is extremely variable. The death loss is usually low but stunting and unthriftiness are important. Acute cases frequently make spectacular spontaneous recoveries.

Symptoms most frequently seen are soreness or stiffness, suggesting arthralgia or myalgia, a shifting lameness, and inability to walk because of painful joints or muscles. The temperature often reaches 108 F. The underside of the body may show circumscribed erythema or reddening.

In many respects, the disease is similar to what has been called swine erysipelas because there is enlargement of the joints with fibrotic periarthritis, gross lesions on the heart valves, fibrinous or fibrotic pericarditis with adhesions, and enlargement of the heart.

This similarity emphasizes again the need for a careful, accurate diagnosis and differentiation between the pathologic changes caused by *Erysipelothrix rhusiopathiae* and those caused by rheumatoid disease. Numerous investigators have consistently been unsuccessful in attempts to produce symptoms of swine erysipelas by administering the so-called causative organism in various channels. If the symptoms caused by the filterable virus of this rheumatoid disease can be differentiated from those presumably caused by *Ery. rhusiopathiae*, we may be making important progress toward a scientific understanding of both diseases.—*L. P. Doyle, D.V.M. (Indiana), at the U. S. Livestock Sanitary Association meeting, Columbus, Ohio, Oct.* 12-24, 1949.

Calves born after a long hard winter may average 10 to 12 lb. less per calf than in a normal year, and such calves are much more susceptible to white muscle disease.

A Technique for the Slow Infusion of Fluids

FRED J. KINGMA, D.V.M., M.S.

Columbus, Ohio

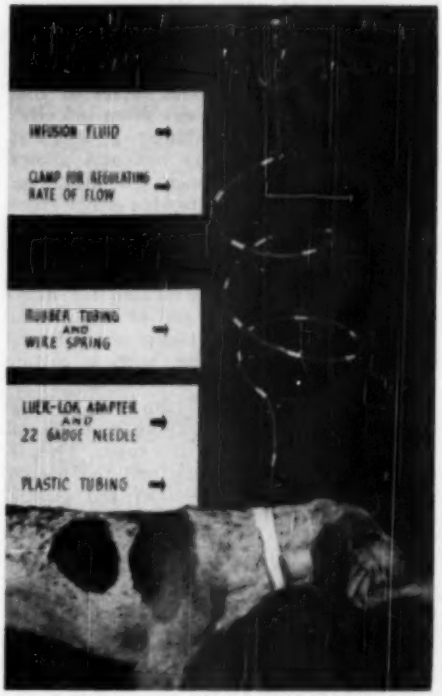
IT IS A well-established fact that one of the most important medical developments in recent years is the use of parenteral fluids. Veterinarians have been presented with many reasons why they should employ fluid therapy. However, most veterinarians, even though they realize that maximum efficiency is not realized from parenteral fluid unless given slowly into a vein, begrudge the time spent in giving the fluids in this manner. Rapid intravenous administration results in the loss of most of the parenteral fluids in the urine. There are similar disadvantages to the intraperitoneal use of fluids. Subcutaneous administration of adequate quantities may do almost as much harm as good.

The technique described in this presentation is a simple means of affording the practitioner a method for employing fluid therapy in such a way that maximum benefit can be derived by the patient. The expenditure for equipment is insignificant. Also, the method is not only simple to employ but requires a minimum of time by the veterinarian.

As can be seen by figure 1, the equipment needed is a short length of plastic tubing (6 to 10 in. transflex)*, about 5 ft. of No. 23 steel spring wire, and the adapter from a Luer-Lok syringe. (Most veterinarians will be pleased to find a use for the adapter from a broken syringe.) The rubber tubing leading from the bottle of infusion fluid to the animal should be approximately 5 to 6 ft. in length.

In the technique employed, the plastic tubing is placed in the jugular vein and remains there for the duration of the animal's illness. The method for placing this tube into the vein is as follows:

A 15- or 16-gauge needle is directed into the jugular vein toward the heart. (Attaching this needle to the barrel of a 5- or 10-cc. syringe may aid in the manipulation of the needle.) The plastic tube is then threaded through the lumen of the needle, and approximately 3 to 4 in. of the tube is inserted into the vein. The needle is then withdrawn, leaving the plastic tube in the vein. As mentioned previously, this tube is allowed to remain in place for the duration of the animal's illness. The author has left it in an animal's vein for three to five weeks without noting any apparent discomfort or tissue reaction. The plastic tube is anchored to the site of emergence from the skin by means of a short length of adhesive tape. Gauze is then wrapped around the neck of the animal, covering all but the last 1 to 2 in. of the plastic tube. This uncovered end is used to make the connection with the tubing from the in-


INFUSION FLUID
CLAMP FOR REGULATING RATE OF FLOW
RUBBER TUBING AND WIRE SPRING
LUER-LOK ADAPTER AND 22 GAUGE NEEDLE
PLASTIC TUBING

— Ohio State University Photograph

Fig. 1—The final assembly of the apparatus for slow infusion of fluids.

*Distributed by the Warren-Teed Products Co., Columbus 8, Ohio.

Dr. Kingma is chairman, Department of Veterinary Pharmacology and Physiology, Ohio State University, Columbus.

fusion fluid. This end should be exposed at the top of the animal's neck. About an inch below this exposed end, adhesive tape is used to anchor the tube to one layer of the gauze. This furnishes additional support to the tube and prevents it from being pulled out of the vein.

A 20- or 22-gauge hypodermic needle is placed into the projecting end of the tube. The function of this needle is to make the connection with the Luer-Lok adapter which has been inserted into the rubber tubing leading from the bottle of infusion fluid. If this needle fits into the plastic tube snugly, it need not be tied to the tube since pulling on the needle actually tightens the connection. When infusion of fluids begins, this needle is attached to the Luer-Lok adapter. The type of infusion bottle used is optional, the only requirement being that the apparatus include rubber tubing at least 5 ft. in length.

To allow free movement of the dog in the cage, the rubber tubing is attached to a coil spring (using string or masking tape) which can be made by wrapping approximately 5 ft. of No. 23 steel spring wire around a cylindrical object such as a 500-cc. serum bottle. The object of this spring is to prevent the dog from interfering with the rubber tubing. It keeps it above the animal's body but still allows almost unlimited movement in the cage. The bottle of fluid is suspended either from the top of the cage or above the cage if the top of the cage is constructed so it will permit the passage of the tube.

If an animal is to be infused for more than one day, the free end of the plastic tube is closed by either plugging the hypodermic needle aseptically with a cotton plug or by removing the hypodermic needle and closing the end of the tube. This latter can be done by tying a piece of string around the tip of the tube. This is then cut off the next day and the needle reinserted. The free end of the plastic tube, with or without the needle, is covered with adhesive tape overnight.

The technique described will allow veterinarians to infuse animals for long periods without the expenditure of more than a few minutes of their own time. The animal is not restrained to any extent. The animals do not seem to either mind or be aware of the apparatus once it is functioning.

Traumatic Gastritis and the Metal Detector

"We have strong reasons to contradict the opinion expressed by Dr. E. A. Churchill (*J.A.V.M.A.*, March, 1950: 196-198) to the effect that the metal detector is of no value in the diagnosis of traumatic gastritis," writes Dr. B. P. Georges Louwagie, of Utrecht. He states that it is only since the advent of the metal detector that practitioners in Belgium have performed rumenotomies routinely.

Two conditions are considered necessary before an animal is considered a good surgical risk: (1) presence of the typical clinical manifestations of gastritis on which most writers agree; (2) a positive reaction to the metal detector.

The fact that several rumenotomies were performed only to find a nail or wire drifting in the reticulum and not imbedded in the wall is considered logical by Dr. Louwagie. In these instances, there were adhesions of the reticulum to the peritoneum and to some of the adjacent organs. These are considered sufficient reason to justify the rumenotomy and removal of the metal.

The instrument used is a war-surplus mine detector (Signal Corps, U. S. Army, SCR-625-C). The operation is performed under strict aseptic conditions, and the recoveries amount to more than 80 per cent, even in cows in advanced pregnancy.

Mercuric Chloride in Actinomycosis.—Being more economical than iodides, mercuric chloride deserves attention as a drug treatment of bovine actinomycosis in the light of European reports. The recommended dosage is 10 cc. of a 1 : 1,000 solution for three consecutive days, and then an injection every five or six days until the response is satisfactory. As a rule, animals of 300 to 500 kg. reportedly require 8 to 9 centigrams distributed over a period of thirty days.

Nembutal, injected intravenously, is recommended for surgery in monkeys (*Vet. Rec.*, June 17, 1950). The preferred site of injection is the vein which corresponds in position to the recurrent tarsal of the dog, and this can be reached most effectively when the patient is restrained face down on a table.

Persistence of Agglutinins Against Pasteurella Tularensis in Serums of Naturally Infected Sheep

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Hamilton, Montana

ALTHOUGH positive agglutination reactions for tularemia have been demonstrated during the course of, and shortly after, an outbreak of this disease in sheep,[1-3] there has been no opportunity, until recently, to determine if positive reactions could still be obtained several months after the termination of the outbreak. Opportunity for doing so was afforded in connection with epizoötic tick-borne tularemia in a band of sheep[4] in Minidoka County, Idaho, in the spring of 1949.

TABLE 1—Results of the Agglutination Tests on 148 Range Lambs

Agglutination	No.	Per Cent
Positive (+++ or ++++ at 1:20 or higher)	23	15.5
Weakly positive (trace, +, or ++ at 1:20 only)	14	9.5
Negative (— at 1:20)	111	75.0

Lambing in the flock, which then consisted of about 290 ewes, started at the home ranch near Rupert on Dec. 25, 1948, and continued through January, 1949. The flock, which totaled about 500 ewes and lambs, was kept at the ranch until April 15, when it was turned out on the range, a semidesert area 6 to 12 miles north of the town of Paul. There were several large, abandoned dry-land farms on this range that had grown up to cheat grass (Bromus sp.), but most of the range had never been under cultivation and in these areas sagebrush predominated.

The first sick animals were noticed on April 28, thirteen days after the sheep were turned out on the range. A ewe and a lamb were found dead the following day. At this time, the sheep were grazing in high sagebrush just south of the prominent butte some 12 miles north of Paul. More dead sheep were observed on May 1, and 12 sick lambs, some of which eventually recovered, were brought back to the ranch during the next few days.

Heavy infestations of wood ticks, *Dermacentor andersoni* Stiles, were observed on the sheep, and ticks were abundant in the grazing area. At the recommendation of veterinarians of the Idaho Department of Agriculture, the flock was sprayed on May 5 by a commercial concern using an insecticide containing benzene-hexachloride and DDT, in addition to other ingredients. The flock was then moved from sagebrush range to grass areas on the dry-land farms where the ticks were less abundant. The outbreak quickly subsided.

TABLE 2—The Ten Highest Titers Observed in Flock of 148 Range Lambs

Lamb (No.)	1:20	1:40	1:80	1:160	1:320	Control
140	++++	++++	++++	+++	0	0
141	++++	++++	++++	+++	0	0
4	++++	++++	++++	++	0	0
76	++++	++++	++++	+	0	0
54	++++	++++	+++	tr	0	0
1	++++	++++	++	+	0	0
47	++++	++++	0	0	0	0
85	++++	+++	+++	0	0	0
81	++++	+++	++	0	0	0
25	++++	+++	++	0	0	0

Preceding and during the epizoötic, the flock watered at two temporary ponds on the range and also received some water hauled from the home ranch wells.

A total of 7 or 8 ewes and 35 lambs died during the outbreak, a mortality of 8 to 10 per cent. No unusual illness was observed in a small band consisting of 2 bucks, 10 ewes, and 16 lambs kept on the home ranch throughout the spring and summer.

On May 5, a sick lamb was shipped to the State Veterinary Laboratory at Boise, Idaho, where it was slaughtered and autopsied. Tissues from this animal were injected into guinea pigs. The guinea pigs died, and spleen and liver tissues of 1 were sent to the Rocky Mountain Labora-

From the Microbiological Institute of the National Institutes of Health, Public Health Service, Rocky Mountain Laboratory, Hamilton, Mont.

The writers are indebted to the owner of the band of sheep and to Mr. Robert Brockie, deputy state sheep inspector, for their coöperation and assistance in obtaining the history of the band and of the outbreak.

tory (Hamilton, Mont.) with the request that they be tested for the presence of *Pasteurella tularensis*. The tissues were injected into 4 guinea pigs. Two animals injected with liver tissue died in four and five days, respectively; 2 injected with spleen tissue died in ten and fifteen days, respectively. All showed gross lesions characteristic of tularemia. Transfer of tissues to fresh animals again produced death and typical lesions. A pure culture of *P. tularensis* was isolated from these transfer animals and confirmed by agglutination with known positive serum.

TABLE 3—Results of the Agglutination Tests on 17 Selected Lambs

Agglutination	No.	Per Cent
Positive (+++ or ++++ at 1:20 or higher)	7	41.2
Weakly positive (trace, +, or ++ at 1:20 only)	1	5.9
Negative (— at 1:20)	9	52.9

TABLE 4—Summary of the Agglutination Tests on Serum Specimens from 283 Mature Sheep

Agglutination	No.	Per Cent
Positive (+++ or ++++ at 1:20 or higher)	56	19.8
Weakly positive (trace, +, or ++ at 1:20 only)	24	8.5
Negative (— at 1:20)	203	71.7

During the epizoötic, blood specimens taken from 6 of the affected sheep were sent to the Department of Public Health, Boise, Idaho, for testing. In a personal communication dated May 31 to Dr. Parker, it was reported that these samples were all positive for tularemia. The individual titers as given by McArthur and Brown[4] were 1:640, 1:1,280, 1:1,280, 1:2,560, 1:5,120, and 1:5,120, respectively.

In September, the lambs from this flock were brought in from the range for shipment. On September 16 and 17, blood specimens for agglutination tests were taken from 148 of these range lambs and from 11 ewes, lambs, and rams that had not been on the range. In November, the ewes were brought in from the range and on November 10, 11, and 12, blood specimens were taken from 283 of them for agglutination tests. The test tube agglutination technique for tularemia was used in testing the blood specimens.*

Results of the agglutination tests on the 148 range lambs are shown in table 1. The 10 highest titers observed in this flock of lambs are shown in table 2. The serums of 11 farm-raised animals showed no trace of agglutination at dilutions of 1:20 or higher.

While the lambs were being bled, the owner recognized certain ones as having been sick during the epizoötic. They were identified mainly by their poor or broken fleeces.

Wool samples were saved from 8 of these lambs with broken fleeces, *i.e.*, some portion of the fleece had been completely shed. These samples were submitted to Mr. G. Curtis Hughes, of the Montana Wool Laboratory, at Bozeman, for examination. In taking the samples, a piece was clipped at the border of the shed and unshed portion of the fleece. A report by Mr. Hughes on these samples states that a distinct break in the wool is evident in seven of the eight samples. Representative of his analyses are the following:

"Lamb No. 47: Sample ⅜ blood. Small lock was 4 inches long. Remainder of sample 1¼ inches long. Indicates the portion 2¾ inches long was mostly shed. Each portion sound. First growth is cotted and weathered. Second growth shows distinct crimp and is soft handling.

"Lamb No. 122: Sample ¼ blood. Length 3¼ inches. Break 2¼ inches from the tip (first growth). Portion on each side of break is sound. Weathered portion is harsh handling and felted. Short portion appears normal.

"Lamb No. 140: Sample ⅜ grade — about 2½ inches long. Break in middle of sample. Some samples indicate complete shedding or loss of fiber outside of break. The weathered exterior portion is sound but appears dead or oxidized. The later growth is sound, appears normal having distinct crimp and good body (or substance)."

A few of these lambs had completely shed their wool shortly after being ill.

TABLE 5—The Ten Highest Titers Observed in Flock of 283 Mature Sheep

Sheep (No.)	1:20	1:40	1:80	1:160	1:320	Control
19	++++	++++	++++	++++	+++	0
234	++++	++++	++++	++++	++	0
170	++++	++++	++++	+++	++	0
177	++++	++++	++++	+++	++	0
188	++++	++++	+++	+++	+	0
2	++++	++++	+++	++	0	0
40	++++	++++	+++	+	0	0
228	++++	++++	+++	+	0	0
231	++++	++++	+++	+	0	0
44	++++	+++	+++	++	+	0

*All agglutination tests reported in this study were made by Miss Lillian Glesne, biological aid, Rocky Mountain Laboratory, Hamilton, Mont.

The agglutination titers on 17 of these animals are shown in table 3.

There was a greater percentage of positive reactions (41.2%) in the group of lambs which had been ill than in the flock of lambs as a whole (15.5%). More than half (52.9%) of the animals designated as having been ill showed no trace of agglutination at the 1:20 dilution.

TABLE 6—Comparative Reactions of Pasteurella Tularensis and Brucella Abortus Antigens in the Serum of Sheep 177

Antigen	1:20	1:40	1:80	1:160	1:320	Control
Pasteurella tularensis	++++	++++	++++	+++	++	0
	1:25	1:50	1:100	1:200	1:400	Control
Brucella abortus	++++	+++	++	++	0	0

Similar agglutination tests were made on serum specimens from 283 mature sheep, which were bled when they were brought from the range in November. These were mostly ewes but there were 10 or less rams in the flock. Summary of the agglutination tests on these are given in table 4. There was a somewhat greater number of positive reactions in the flock of mature animals (19.8%) than was observed in the flock of lambs (15.5%).

Titers on a few individual adult animals were only slightly higher than any observed in the lambs. The 10 highest titers are shown in table 5.

TABLE 7—Titers of 8 sheep showing Trace of Agglutination with Brucella Abortus Antigen

Sheep (No.)	1:25	1:50	1:100	1:200	1:400	Control
177*	++++	+++	++	++	0	0
94	++	++	+	0	0	0
19*	++	+	0	0	0	0
168	++	+	0	0	0	0
98	++	+	0	0	0	0
144	+	0	0	0	0	0
196	+	0	0	0	0	0
214	+	0	0	0	0	0

*Serum positive for tularemia.

It could be postulated that the observed titers for *P. tularensis* were due to *Brucella abortus* infection, as it is known that cross-agglutination is exhibited by some human and animal serums positive for *P. tularensis* and *Br. abortus*. To exclude this possibility, 82 serums from the flock of ewes, including all samples that showed any titer for *P. tularensis*, were also tested for agglutination of *Br. abortus* using the slide technique. The highest titer observed, and the only one that gave a ++++ reaction at 1:25, the lowest dilution tested, was in the serum from sheep 177 which was also positive for tularemia. The comparative reactions are shown in table 6. Only 8 others showed any trace of agglutination with *B. abortus* antigen and these titers are given in table 7.

DISCUSSION

Tularemia is probably a fairly common disease of sheep on the western ranges but, appearing as it does in the early spring months when the sheep may be in poor condition and feed scarce, it receives little attention unless it reaches epizoötic proportions. Losses at this season are also obscured by expected losses associated with lambing.

The first accounts[1] of tularemia infection in sheep in nature demonstrated infection in 8 sick, dead, or convalescent animals by isolation of cultures or demonstration of high agglutinin titers for *Pasteurella tularensis*. These animals were infested with ticks. More information on the source of these animals and further data on earlier outbreaks of disease in sheep, probably due to tularemia, were presented in other papers.[2,3]

Reported epizoötics associated with heavy infestations of wood ticks, *Dermacentor andersoni*, in Idaho[3] and eastern Montana[2] are shown in table 8.

TABLE 8—Epizootics in Idaho and Montana Associated with Heavy Infestations of Wood Ticks, Dermacentor Andersoni

Location	Date	Remarks
IDAHO		
Near Mountain Home	1919	250 lambs lost.
Nampa	1920	Losses not estimated.
Shoshone and Mountain Home	1923	150 ewes lost in 1 band, 90 lambs in another, 1,300 lambs lost in 10 other bands.
Shoshone	1924	Some fatalities, but less severe loss than in 1923.
Arco	1927	5,000 to 5,000 animals lost on ranges tributary to Arco.
Mountain Home	1927	Recurrence near Mountain Home.
MONTANA		
Near Miles City	1923	100 sheep lost in 4 bands, unest. number in 5th band.
Near Calabar	1925	Unest. number affected.
Near Powderville	1925	Over 100 animals affected.

The epizoötic which was studied most thoroughly,[1,5] and in which tularemia infection was conclusively demonstrated, occurred near Mountain Home, Idaho, in 1928. It was estimated that 60 lambs and 15 ewes had died in the flock of 1,900 ewes, yearlings, and lambs that was affected.

Another epizoötic of tick-borne tularemia was studied[3] in a band of sheep at Ringling, Mont., in April and May, 1934. From a band of 1,320 yearling ewes, 200 died during the outbreak and about 40 per cent of the flock was affected. Cultures of *P. tularensis* were recovered from ticks which were abundant on the sheep, from tissues of sick and dead sheep, and from dead rabbits in the epizoötic area. High titers for *P. tularensis*, 1:80 to 1:2,560, were demonstrated in the serums of sick and convalescent animals. Serums positive for *P. tularensis* also gave strong reactions with *Brucella abortus* antigen and titers as high as 1:1,280 were observed.

The epizoötic near Rupert, Idaho, here reported, followed the pattern of previous outbreaks of tularemia in sheep in that the animals were grazing in a sagebrush area in the spring, wood ticks (*D. andersoni*) were abundant and infested the sheep, many animals were affected, and about 10 per cent of the flock died. The outbreak subsided when the tick-infested sheep were effectively sprayed and moved to tick-free pasture. Not only was infection demonstrated in the band at the time of illness, but agglutinins were found in serum samples from 15.5 per cent of the lambs and 19.8 per cent of the ewes, five and seven months, respectively, after the epizoötic.

Economic loss in this outbreak resulted from death of about 8 ewes and 35 lambs, illness in a large proportion of the animals, loss of condition in affected animals that recovered, expense of spraying, and definite damage to the fleeces of affected animals because of illness. Such damage to fleeces has not previously been associated with tularemia infection.

The persistence of agglutinins against *P. tularensis* for five and seven months, which we have found in this flock, demonstrates that this test is useful for the diagnosis of tularemia in sheep long after they have recovered.

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Influence of Breed on Canine Distemper

Veterinarians of broad experience have observed a relation of breeds to the receptivity and prognosis of canine distemper, and that fanciers of the less sensitive breeds are thrown off their guard against the terrors of the disease when they change to the raising of these less resistant breeds. Pomeranians and Fox Terriers, for example, seldom develop the grave complications suffered by Beagles, Pointers, Setters, Spaniels, and Shepherds, according to reliable authorities. In members of the more resistant group, the infection tends to be so benign and transient that their keepers are unaware of its deadly complications and long duration in dogs of the less resistant types. Between these two extremes are the intermediate oscillations of virulence which account for the controversial reports on vaccinations and treatments. Whether measured from the standpoint of resistance, susceptibility, pathology, prognosis, or clinical duration, there is no contagious disease of animals more variable than canine distemper. The gratifying result in one instance changes to failure in another, without obvious reason.

A vaccine or drug of uniform dynamics, therefore, can not be expected to come up with uniform statistics in the face of variable reactions among the breeds. As Cazenave (*Rev. Méd. Vét.*, Lyon, Feb., 1950) points out, statistics for each breed would be more reliable.

Transmission of Rickettsia Conjunctivae to Goats

S. W. H. RIZVI

Ajmer, India

History and Symptoms

A group of plain *desi* (native) goats was purchased as breeding stock in March, 1945. The goats covered 24 miles of mountain country in about three days and were exposed to a sudden change of climate. A few days after their arrival, some of the goats developed ophthalmia and severe keratitis. They recovered with ordinary treatment. The condition was thought to be due to the sudden change of climate and altitude. Such conditions were said to have occurred previously. After some time, a few more goats, locally purchased for experimental use, were observed to be suffering from conjunctivitis, and the condition seemed to become aggravated when they were under experiment. Conjunctival smears from these revealed *Rickettsia conjunctivae*.

In natural cases, the course of the disease in goats and sheep is very mild. Generally, nothing more than conjunctival catarrh could be observed, with slight mucopus at the inner canthus. Trachoma-like lesions as previously described[1] were also found. These were generally located on the conjunctiva of the upper eyelid and nictitating membrane.

A general survey showed that 75 to 80 per cent of all goats were presenting a stage of the disease, so that infection appeared to be quite common. This agrees with an earlier statement[1] that it was impossible to get clean goats for transmission work. The incidence of this infection in sheep and goats was later found to be fairly common in Rajputana states. For examination, smears from the conjunctival scrapings were stained by Giemsa's method.

There are few data regarding the incidence of this infection among animals in India,[6] although the condition appears to be widespread. Possibly, the mild nature of the disease does not attract the attention of herdsmen. Until the condition was mentioned as "notoriously prevailing" in South Africa,[2–5] it was unknown there. This statement is also true of India.

Experimental

Nine newborn kids, 4 to 20 hours old, were used. All were segregated in a fly-proof room to avoid infection by other means. The possibility of the infection being congenital was ruled out by examining conjunctival smears from 89 kids within a few hours of birth. The results of these examinations were negative.

Technique and Material.—Before infecting the kids experimentally, conjunctival slides from both eyes were examined. This was done by gently scraping the conjunctiva with the smooth edge of a glass slide and spreading the material on another. The slides were air-dried, fixed, and Giemsa-stained. None of the kids showed infection. The infective material obtained by lightly scraping the conjunctiva of a goat suffering from the natural disease was gently applied to the conjunctiva of one eye of the experimental animal, the other eye acting as control. It was also intended to see whether the infection would spread to the healthy eye. The first lot of kids was infected with material from the natural case; in subsequent experiments, the material was obtained from artificially infected animals.

Observations.—Conjunctival films were examined daily, with the result that all the kids showed the presence of *R. conjunctivae* within forty-eight to ninety-six hours of the infection, except in 1 kid which manifested the infection on the sixth day.

In the early stage, the infection is mild in the sense that only a small percentage of epithelial cells are infected. Neutrophils are numerous, increasingly so as infection progresses, so that at a certain stage slides prepared from the lesion show a mass of leucocytes surrounding the infected cells. The presence of such an accumulation of neutrophils strongly suggests infection, and among the leucocytes an infected epithelial cell may be located for special examination. The infection appears in waves

Dr. Rizvi, formerly veterinary investigation officer at Ajmer, is now veterinary officer, Karachi, Pakistan.

Thanks are due Dr. F. C. Minett for assistance in compiling this paper.

and the Rickettsia seem to multiply quickly for two to three days and then gradually decrease. During the stage of multiplication, a large number of cells are packed with *R. conjunctivae* and neutrophils are seen to be attacking the infected cells, which undergo karyolysis. The uninoculated eye also develops the disease.

In these experiments, apart from *R. conjunctivae*, another unknown intracellular organism[2] was also seen. This organism usually appeared first or simultaneously with *R. conjunctivae*, its numbers alternating with the latter organism.

A kid infected with material which appeared to contain only the unknown intracellular organism showed a mixed infection with *R. conjunctivae* and reacted like all other kids infected with apparently pure *R. conjunctivae* material.

In morphologic and staining characters, these bodies are more or less like *R. conjunctivae*, except that they are less pleomorphic, stain more deeply, and do not form clumps. Possibly, there is some relationship between the two organisms and one may even represent some stage in the development of the other. It is difficult to support this hypothesis, since the material, no matter how collected, is always contaminated.[2]

Contact infection.—To study the spread of infection by direct contact, and, if positive, to note the period of incubation, a newborn healthy kid was housed with artificially infected kids in a small fly-proof room. The test animal showed *R. conjunctivae* on the seventh day. It showed the usual signs of local infection, *viz.*, lacrimation, congestion, and leucocytosis on the fourth day, while Rickettsia were seen on the seventh day. It is likely that this kid was infected from the other kids by direct contact; if so, this explains how kids become infected at an early age and give rise to a high incidence of infection in the goat population. That trauma, set up while preparing the conjunctival smears, played no part in causing the infection seems likely from the following experiment.

The conjunctivae of both eyes of 2 healthy kids were gently injured with the edge of a glass slide—as was practiced with other experimental kids—but not purposely infected. They were then placed in a clean room under strict segregation; even contact with the dam and any chance of fly-borne infection was avoided. Observation over fifteen days failed to reveal *R. conjunctivae*.

CLINICAL SYMPTOMS

On the second day after infection, congestion of the conjunctiva and slight lacrimation is noted. In most cases, a profuse discharge causes the eyelids to stick together. Later, the discharge is mucopurulent and collects at the inner canthus. Within a week, acute symptoms subside, the conjunctiva is petechiated and gradually develops granules varying in size from that of a poppy seed to a lentil. Such granules are commonly located on the membrana nictitans and within the upper eyelid. Visible granulation begins as early as ten days after infection and is completed in about two months. No severe sequelae, such as ophthalmia or keratitis, develop after infection. In fact, infection is so mild that it may pass unnoticed, but flies attracted by the discharge are a source of worry to the animals.

DESCRIPTION OF THE ORGANISMS

Both *R. conjunctivae* and Cole's organism are essentially intracellular, though free forms are common, perhaps following rupture of degenerated cells. The cells are packed with *R. conjunctivae*, but Cole's organism is distributed rather diffusely and not as clusters. Both stain well with Giemsa, though Cole's organism usually has a deeper color, which nevertheless is fainter than with ordinary bacteria. Both are gram-negative. *Rickettsia conjunctivae* is very pleomorphic, Cole's organism is less so.

SUMMARY

Conjunctivitis in young goats, due to *Rickettsia conjunctivae*, is easily transmitted by mechanical means and also by contact. Symptoms appear in three days and Rickettsia seven days later. Infection introduced in one eye spreads to the other.

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Chronic Swelling of the Maxilla of Young Horses

The painless tumefaction of the maxilla in the region of the third premolar of horses 2½ to 3½ years old does not seem to be too well understood in these days of lagging equine pathology.

The lump, usually unilateral, is composed of cancellated tissue proliferated in the skull structure above the roots of an entrapped permanent third premolar by tardy shedding of its temporary companion. Blocked against pushing its way into the mouth, its growth bulges the adjacent skull, without causing any perceptible pain or edema. The onset is quite sudden and the duration chronic. Inasmuch as the lump blemishes the facial profile of a fine horse, it is likely to be subjected to the wrong treatment under the urge of an anxious owner.

Radical treatment is out of order. Assuming that calcium deficiency is a factor in aberrant dentition, rational nourishment is indicated. Surgery and harsh applications are ruled out. Only natural processes can readjust the faulty mechanism. Premature extraction of the tardy temporary tooth tends to narrow the path for the permanent one. The permanent second premolar and the first molar (fourth) are already in place when this maxillary bulging occurs, and therefore tend to delay readjustment by narrowing the gap through which the permanent third premolar must descend to reach the level of the arcade. The treatment is expectant, the prognosis favorable, if the lump is not molested. The facial profile will level off in two to six months.

Mistaken for decay of the molar, such cases have been subjected to trephining and brutal punching out of the lesionless tooth, to no good purpose and a scar-blemished face.

Veterinary dental pathologists see a fundamental relationship between this tardiness of the third premolar and that frequency of decay of the first (fourth) molar, so characteristic in the equine species.

The importance of diet during tooth development has long been recognized and widely discussed in the human being, but it is seldom mentioned in farm animals. In the horse, molar development is complete and solid at 3 years of age. The diet is, therefore, important at the time this dental trouble occurs.

Tuberculosis Problem Herds

The two most difficult problems in tuberculosis eradication today are the no-visible-lesion reactors, and the increasing incidence of tuberculous herds in some areas.

Correct use of the tuberculin test involves three factors: the man, the tuberculin, and the cow. The veterinarian making the tests has the least effect on the final reaction unless it be by gross carelessness or utter neglect, or through improper relations with the owner. In most instances, the veterinarian and the test fare better when the situation is fully explained to the dairyman. Otherwise, he becomes confused to find that one veterinarian interprets swellings differently from another, or that in one herd certain animals are removed whereas in another herd they are permitted to remain.

The problem herds are becoming less of a problem with the realization that check testing with the subcutaneous or temperature test eliminates much of the question, and with the use of cervical injections because of greater sensitivity to tuberculin in the neck area than on the caudal fold.

Public Health officials have expressed some concern over the increased incidence of tuberculosis in certain areas. Some of these public health officials have suggested that replacements and nonreacting cattle in such herds be vaccinated with BCG. Says the author (Traum): "Imagine what that would do to a tuberculin testing program."—*Proceedings, Fifty-Third Annual Meeting of the U. S. Livestock Sanitary Association, 1949.*

Pathology of the Chicken Embryo Infected with Infectious Bronchitis Virus

(An Abstract)

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THE STUDY here reported* was undertaken as a contribution to fundamental virus research and as a possible aid in the differential diagnosis of avian respiratory diseases. The disease is not new, having been described in 1931 by Schalk and Hawn. The pathologic changes caused by the virus when injected into embryonating chicken eggs were first described by Beaudette and Hudson in 1937. The present report agrees with these previous ones, and presents for the first time color illustrations (plates 1 and 2) of the infected embryos.

The gross alterations of the embryo are considered to be pathognomonic of infection with infectious bronchitis virus. Some of these could be recognized easily by candling the eggs, and this was particularly true of the curled position and sluggish movements of the infected embryos. The following changes were observed regularly, and helped in making a correct diagnosis:

1) The chorioallantoic membrane was adherent to the shell membrane and appeared thinner than normal.

2) The amnionic membrane was thickened, dry, fibrotic, resisted removal from the embryo, and restricted embryo movement. The volume of amnionic fluid was considerably less than normal.

3) Living, infected embryos were sluggish and weak.

4) Embryos were dwarfed as much as one-half normal size and had a firm, ball-like shape characterized by a curled position with a wry neck and the feet deformed and compressed over the head. Bones were softer than normal and immature in development. The leg bones and tarsal joints were deformed.

5) Feather development was immature and the feathers were drier than normal. The skin and feathers were icteric and dermal petechiae were observed in some embryos. No abnormal odor was noticed.

6) In about 25 per cent of the embryos,

*This is a condensation of the article which appeared in the American Journal of Veterinary Research, 11, (July, 1950) :245-251.

Legends for Illustrations on Opposite Page

PLATE I

Fig. 1—Top: 16-day-old infected embryo (first passage of virus, sixth day after infection) showing dwarfing, curling, deformity of tarsal joint, opacity of extraembryonic membranes, and firm consistency of yolk material.

Bottom: 16-day-old normal embryo.

Fig. 2—17-day-old infected embryo (eighth passage of virus, seventh day after infection) showing typical, pathognomonic, curled position, with feet deformed and compressed over the head.

Fig. 3—17-day-old infected embryo (first passage of virus, seventh day after infection) showing dwarfing, deformed feet and tarsal joint, immature feather development, and cloaca distended with fatlike droplets.

Bottom: 17-day-old normal embryo.

Fig. 4—Top: Lung, liver, and heart from 19-day-old infected embryo (eighth passage of virus, ninth day after infection). Retardation of lung development, pneumonia, and viscid, serous exudate on the surface and periphery of the lungs. Hemorrhagic hepatitis with a necrotic area on the posterior tip of the right dorsal lobe of the liver.

Bottom: Lung, liver, and heart from 19-day-old normal embryo.

Figure 1

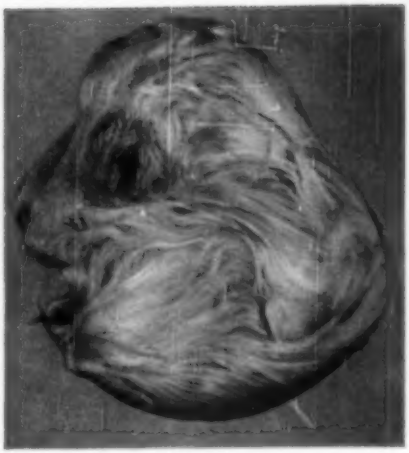

Figure 2

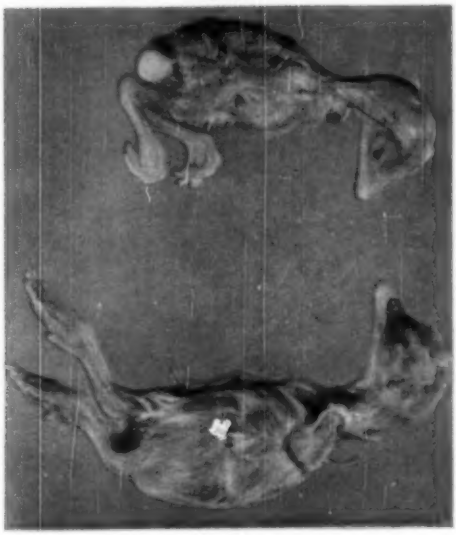

Figure 3

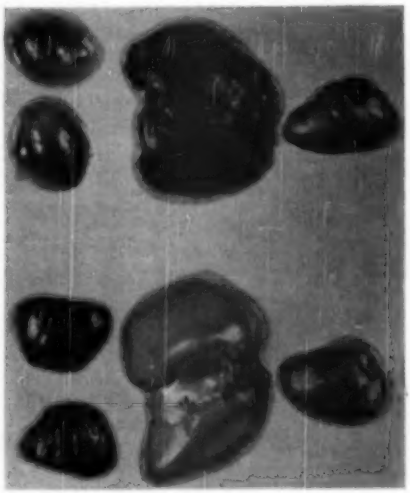

Figure 4

Plate I

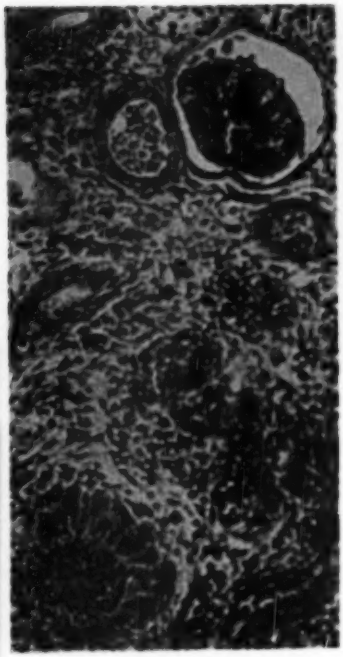

Figure 1

Figure 2

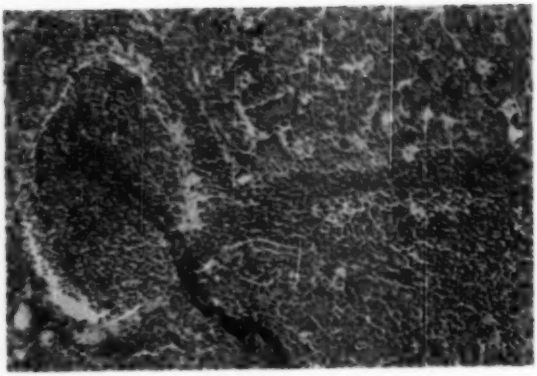

Figure 3

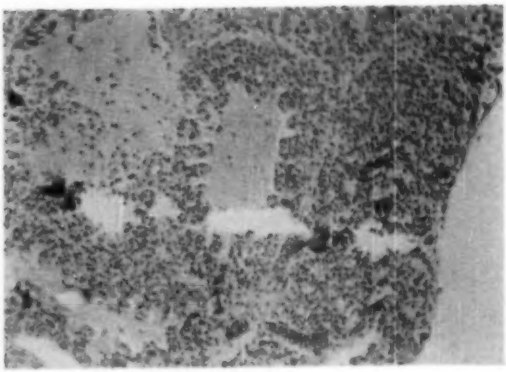

Figure 4

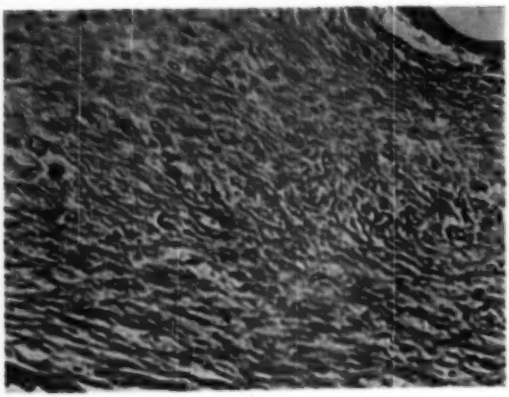

Figure 5

Plate 2

the cloaca was distended with white fatlike droplets.

7) Retardation of development of the body walls frequently resulted in an incomplete closure of the abdomen.

8) Yolk material was of a firmer consistency than normal.

9) Internal organs:

a) Livers were either hemorrhagic, icteric, or contained necrotic foci.

b) Kidneys were usually swollen, icteric, and contained some necrotic foci.

c) Lungs were small, pale, and viscid with a serous exudate.

d) Heart was about one-half normal size.

e) Spleen was enlarged to twice normal size.

10) Approximately, 1 to 2 per cent of the inoculated embryos did not show gross alterations.

The microscopic alterations were also useful in helping to establish the nature of an infectious agent and to verify the diagnosis made on the basis of gross lesions. The changes observed in microscopic studies were:

11) There was an excessive proliferation of the cells in the mesoderm and ectoderm, and edema of the chorioallantoic membrane.

12) The amnionic membrane was edematous.

13) Internal organs:

a) Hepatic hemorrhage, necrosis, and abscess formation.

b) Pneumonia with marked serous exudation.

c) Interstitial nephritis and necrosis were observed.

d) Congestion of the spleen.

e) Slight capillary congestion of the brain.

Infectious bronchitis in naturally infected chickens is characterized by a short incubation period, rapid spread, and short duration. Typical symptoms reported by owners are sneezing, coughing, and respiratory râles. The gross lesions usually seen are accumulations of mucus in the lower trachea and bronchi, congestion and edema of the lungs, cloudiness of the air sac membranes with accumulations of cheesy material and, in young birds, facial swellings and nasal exudate.

The morbidity is high. The mortality is high in young chicks, but decreases rapidly with age until it is negligible in semimature and adult birds. Chickens recovered from the disease are immune, and blood tests reveal the presence of neutralizing antibodies.

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PLATE 2

Fig. 1—Kidney from 17-day-old infected embryo (eighth passage of virus, seventh day after infection) showing plugging of proximal convoluted tubule with hemoglobin-like cast at lower left. Edematous tissue with disintegrated tubules at center. Dilated glomerular space containing desquamated cells with an enlarged and congested glomerular tuft. 135 x.

Fig. 2—Left: Kidneys from 18-day-old infected embryo (eighth passage of virus, eighth day after infection) showing decrease of size of pelvic girdle and enlargement of kidneys. Bile pigmentation of kidney on upper left and necrotic foci of kidney on lower left.

Right: Kidneys from 18-day-old normal embryo.

Fig. 3—Liver from 15-day-old infected embryo (eighth passage of virus, fifth day after infection) showing perivascular cuffing with cells of the granulocytic series. 90 x.

Fig. 4—Lung from 18-day-old infected embryo (eighth passage of virus, eighth day after infection) showing pneumonia with serous exudation, and granulocytic and lymphocytic infiltration. The bronchial sacs are filled with serous exudate containing granulocytic and desquamated epithelial cells. 90 x.

Fig. 5—Chorioallantoic membrane from 15-day-old infected embryo (third passage of virus, fifth day after infection) showing edema and cellular proliferation of the mesoderm and ectoderm. 135 x.

Antibacterial Drugs in Bovine Mastitis

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PENICILLIN has been proved efficacious in the intramammary treatment of bovine streptococcic mastitis, both by promoting clinical improvement and by eliminating carriers of infection. Sulfanilamide, sulfamethazine, or sulfathiazole was combined with penicillin for intramammary infusion by Johnson and Roberts.[1] They reported better clinical and bacteriologic results with fewer injections of the combination than with any of the drugs alone. Bacitracin was reported by Benson[2,3] to show definite promise as a therapeutic agent for the treatment of streptococcic mastitis. Aureomycin gave good clinical results for staphylococcic mastitis in a trial by McCulloch *et al.*,[4] but the majority of quarters remained infected.

In the present study, comparative determinations were made of the value of penicillin in water or oil-water vehicles, bacitracin, aureomycin, and a combination of penicillin and sulfonamides for elimination of streptococcic infection from the mammary gland. In addition, antibacterial agents were infused into mammary glands to determine their irritating effects. The concentration of the drugs in the foremilk was also determined at intervals after therapy. The *in vitro* effects of some of these drugs on mastitis organisms were reported previously.[5]

MATERIALS AND METHODS

The powdered sulfonamides were weighed, added to sterile U.S.P. mineral oil, and mixed in a Waring blendor. The final preparation contained 10 Gm. of the drug per 50 ml. of suspension. When penicillin was added to this suspension, the penicillin was dissolved in sterile distilled water and admixed with it to produce a final concentration of 1 part of penicillin solution in 9 parts of the oil-sulfonamide suspension. Mixing was accomplished by repeatedly drawing and expelling the material from a large syringe. This mixture was temporary and was prepared immediately before use. The vehicle for penicillin alone was either distilled water or a commercial preparation of mineral oil, water, and lanolin called penicle. The vehicle termed oil-water was a mixture of 10 per cent water in mineral oil prepared as previously described.[6] Bacitracin was dissolved in sterile, double distilled water at the rate of 45,000 units per 20 ml. In the bacitracin experiment, penicillin was also dissolved in 20 ml. of distilled water. In the experiment with aureomycin, that drug was administered in an anhydrous ointment containing 200 mg. of the drug per 7.5 Gm. of oil vehicle, and penicillin was administered in penicle.

TABLE 1—Effect of Single Intramammary Doses of Penicillin, of Penicillin and Sulfamethazine, and of Penicillin and Sulfadiazine on Streptococcic Infections of the Udder

Sulfonamide	Amount	Penicillin (units)	Quarters treated	Quarters negative (No.)	Quarters negative (%)
Sulfadiazine	10 Gm.	50,000	35	13	37
Sulfamethazine	10 Gm.	50,000	32	16	50
None	.....	50,000	18	5	28

The cases of streptococcic mastitis utilized for these trials were among cows in 15 herds in the vicinity of Madison, Wis. Thirteen of the herds had not been subjected to systematic penicillin therapy prior to the trials. The other two herds had had one or more series of systematic treatments with penicillin applied at various intervals previously. Some of the animals in these two herds had failed to respond to previous penicillin therapy and, therefore, might have been somewhat more resistant to recovery than the average untreated case of streptococcic mastitis.

The Hotis test, microscopic examination of incubated samples, and streak-plating of incubated samples on mannitol-blood-agar were the criteria used to establish the presence of a streptococcic

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Drugs used in these trials were furnished by Martin Laboratories, West Chester, Pa.; Wallace Laboritories, Inc., New York, N.Y.; Lederle Laboratories, Pearl River, N.Y.; American Scientific Laboratories, Madison, Wis.; Commercial Solvents Corporation, Terre Haute, Ind.; Merck and Co., Rahway, N.J.; and E. I. Dupont de Nemours and Co., Wilmington, Del.

Dr. Frank Meleney, College of Physicians and Surgeons, Columbia University, New York, and Dr. Louis Holm, University of California, Davis, aided in the bacitracin experiment. Statistical analyses were made by the University Computing Service under the direction of K. J. Arnold and R. G. D. Steel.

infection. A quarter was considered infected if the streaked plate disclosed colonies which possessed the characteristic colonial morphology of streptococci and also if positive for streptococci in both the Hotis and microscopic tests, even though negative on plate culture.

The infected cows were divided into equal groups according to the stage of lactation and the number of infected quarters per cow. All infected quarters of an individual cow were treated with the same material in the doses indicated in tables 1, 2, and 3. Infusions were performed immediately after the evening milking. A control group of infected cows in each herd was given 10 or 20 ml. of the vehicle containing no drugs.

TABLE 2—Therapeutic Efficacy of Two Doses of Bacitracin and/or Penicillin in Distilled Water Given with a Three-Day Interval for Treatment of Streptococcic Mastitis

Drug	Amount per dose	Volume of distilled water	Quarters treated (No.)	Quarters freed of infection (No.)	(%)
Bacitracin	45,000 U.	20 ml.	30	6	20
Bacitracin Penicillin	15,000 U. 25,000 U.	20 ml.	30	15	50
Penicillin	100,000 U.	20 ml.	30	17	27
None		20 ml.	30	8	27

The control and treated animals were reëxamined at weekly intervals for three successive tests beginning seven to ten days after final therapy. The testing methods after treatment were the same as those before treatment. A quarter was considered bacteriologically recovered when all successive tests were negative for streptococci. A *chi*-square analysis of the resulting data was made using Yates' correction.

Assays for penicillin in the milk after treatment were made to determine the duration of an inhibitory concentration in the milk. Successive dilutions of foremilk samples were made in sterile, skimmed milk to which bromcresol purple had been added. The original sample and all dilutions were then inoculated with 0.1 ml. of a 1:100 dilution of a 24-hour milk culture of *Streptococcus agalactiae*. The mixtures were incubated at 37 C. for twenty-four hours and observed for the relative amount of acid production. Significant dilutions were streaked on blood-agar plates and examined after further incubation for the characteristic growth of the strain of *Str. agalactiae*. By comparison between the relative amount of acid production in the unknown and in milk containing known amounts of penicillin, the approximate amount of penicillin in the original sample could be determined. This method was used to determine the time during which penicillin or other drugs persisted in the milk in a concentration sufficient to inhibit the growth of *Str. agalactiae*.

The irritating effect of various materials for the mammary gland was determined by the technique described in a previous paper.[9] The drug to be tested was injected into a recently evacuated quarter which was producing normal milk. A physical examination of the udder and determinations of the chloride and catalase content of the milk were made before treatment and at intervals after treatment to establish the severity and persistence of the inflammatory reaction produced. The drug 4:4' diamino diphenyl sulphone (hereafter called sulphone) was examined for degree of irritability and persistence in this study.

RESULTS

The therapeutic efficacy of sulfonamides combined with penicillin, and of penicillin alone in a single dose, are given in table 1. The sulfonamides probably have a synergistic action with penicillin for the elimination of streptococcic infections. Nevertheless, there was no significant difference between sulfadiazine with penicillin, and penicillin alone by the *chi*-square method of analysis. Sulfamethazine was not significantly better than sulfadiazine when used in combination with penicillin.

The results from the bacitracin trial are indicated in table 2. Penicillin was significantly better than bacitracin and the combination of bacitracin and penicillin was more efficacious than bacitracin alone, but not better statistically than the control vehicle. Little or no clinical benefit was observed following bacitracin therapy. Under the conditions of the experiment, bacitracin appeared to have no value for elimination of streptococcic infection. There was no evidence of a synergistic action between penicillin and bacitracin.

TABLE 3—Therapeutic Efficacy of Single Doses of Aureomycin and of Penicillin for Treatment of Streptococcic Mastitis

Drug	Amount	Vehicle	Quarters treated (No.)	Quarters freed of infection (No.)	(%)
Aureomycin	200 mg.	ointment	58	38	66
Penicillin	100,000 U.	penicle	58	45	78
None	———	mineral oil	48	11	23

The results from the therapy of streptococcic mastitis with aureomycin are presented in table 3. There was no significant difference between aureomycin and penicillin, and the probability was 0.221 that the observed difference was due to chance.

Quarters selected for the experiment were usually positive on all three of the bacteriologic tests prior to treatment. After treatment, the number of streptococci in

the milk was small. The Hotis test and microscopic examination of incubated samples were not reliable after treatment, because they were negative in many of the quarter samples shown to contain mastitis streptococci by the plating technique.

The results of tests of the irritating action of drugs for the normal mammary gland are presented in table 4. The bougie (Martin's mastic) was least irritating of all the materials tested. It produced a slight rise in catalase and chlorides in the milk with no detectable swelling of the gland. Penicillin in oil-water or penicle, and streptomycin in distilled water, produced a slight swelling within six hours after injection and a moderate increase in chloride and catalase content. This reaction had diminished after twelve hours and was absent in twenty-four to forty-eight hours. Formolized gramicidin was less irritating than either gramicidin or tyrothricin, but all three produced a relatively long-lasting reaction. The sulfonamide suspensions in mineral oil were moderately irritating, but the sodium salts of sulfamethazine or the sulfone in aqueous solution produced a marked reaction characterized by a firm swelling of the gland, high catalase values, and many clots in the milk.

The persistence of certain drugs in the mammary gland following infusion is also indicated in table 4. Penicle prolonged the effective concentration of penicillin to sixty hours, as compared with twenty-four hours for other penicillin vehicles. The action of gramicidin, tyrothricin, and streptomycin persisted for twelve to twenty-four hours. The sulfonamides usually persisted for less time than did the antibiotic materials. The antibacterial activity of sulfamethazine, sulfamerazine, and sulfadiazine lasted less than ten hours.

DISCUSSION

In experimental studies to determine the value of treatments for mastitis, the percentage of quarters clinically improved, or the percentage freed of infection, means very little unless two or more treatments are compared in the same herds under the same conditions. Workers have reported remarkably high efficacy for most of the drugs used in mastitis therapy. Such reports are misleading even to the veterinary profession, and may cause dissatisfaction among laymen who anticipate better results than can be obtained with clinical cases of mastitis treated in the average dairy cattle practice. These enthusiastic research reports form the basis for advertising and articles to farmers indicating, in effect, that the problem of bovine mastitis can be solved completely by treatment.

TABLE 4—Relative Degree and Duration of Inflammation and Persistence of a Concentration Inhibitory to Streptococcus Agalactiae Following Injection of Materials into Normal Mammary Glands

Drug	Amount	Vehicle	Volume in ml.	Inflammatory reaction		Persistence in hours inhibitory concentration	
				degree	duration in hours	at least	less than
Penicillin G	25,000 U.	bougies	0.25	very slight	12-24	24	36
Penicillin G	25,000 U.	oil-water	10	slight	24	24	36
Penicillin G	100,000 U.	penicle	20	slight	24	60	72
Streptomycin	0.54 Gm.	water	20	slight	48	12	24
Gramicidin	30 mg.	glycol*	15	marked	96	12	24
Formolized gramicidin	60 mg.	glycol*	15	slight	96	12	24
Gramicidin Chlorophyll	50 mg. 300 mg.	glycol*	15	marked	120	12	24
Gramicidin Chlorophyll Urea	30 mg. 300 mg. 1.5 Gm.	glycol*	15	moderate	96	12	24
Tyrothricin Chlorophyll	150 mg. 300 mg.	glycol*	15	marked	96	10	24
3', 5'-dibromo sulfanilanilide	10 Gm.	mineral oil	50	moderate	48	12	24
4:4'-diamino diphenylsulphone	10 Gm.	mineral oil	50	moderate	48-96	12	24
Disodium sulphone	10 Gm.	water	45	marked	72-96	9	12
Sulfamethazine	10 Gm.	mineral oil	50	moderate	48	6	9
Sodium sulfamethazine	10 Gm.	water	40	marked	96	6	10
Sulfamerazine	10 Gm.	mineral oil	50	moderate	72	6	9
Sulfadiazine	10 Gm.	mineral oil	50	moderate	72	6	9

*This vehicle consisted of carbowax, 33.3 per cent, and propylene glycol, 66.7 per cent.

In the opinion of the authors, treatment must be merely an aid to control mastitis.

In the experiments reported here, two or more treatments were compared in the same herds. The combinations of penicillin and a sulfonamide were not sufficiently better than penicillin alone to warrant their use in chronic streptococcic mastitis. Bacitracin appeared to have no value for elimination of streptococcic infection. This conclusion was different from that of Benson, and further trials may indicate a reason for the difference in results.

Aureomycin was shown to have a definite therapeutic activity against streptococcic mastitis. Further work is indicated to determine the degree of irritation it causes, its optimum dose, and whether a synergistic action might occur between it and penicillin. From a theoretic point of view, aureomycin might be desirable in conjunction with penicillin because of the differing antibacterial spectrum. If the type of infection in a case of clinical mastitis were doubtful or unknown, a mixture of drugs, such as penicillin and sulfonamides or streptomycin or aureomycin might be helpful. In the treatment of streptococcic mastitis, there is no established reason, at present, for using more than penicillin alone.

Study of the irritating effect of various drugs was part of a screening test for selection of promising materials to be used in field trials. Penicillin proved to be as innocuous as had been reported previously. Streptomycin was similarly harmless and should be safe for intramammary injection. Gramicidin and tyrothricin produced a long-lasting moderate-to-severe reaction and must be used with caution, if at all. The formolized gramicidin was found to be less irritating for the mammary gland than gramicidin, though the reaction from it was more severe and enduring than that from penicillin.

The reaction from solutions of sodium salts of the sulfonamides resembled an episode of acute infectious mastitis. These salts in solution were more irritating and persisted in an inhibitory concentration in the milk for a shorter time than suspensions of the same quantity of the powdered drug in mineral oil. Therefore, suspension in mineral oil would seem to be preferable for intramammary instillation. The two drugs 3:5 dibromo sulfanilanilide and 4:4' diamino diphenyl sulphone were the most persistent of the sulfonamides tested. As they have been shown previously by Francis,[7] Goetchius and Lawrence,[8] and Kraft *et al.*[9] to be bacteriostatic and bactericidal for streptococci, these compounds offer considerable promise. Francis also has shown that sulphone is therapeutically active against streptococcic mastitis.

Streptomycin given by the intramammary route persisted for at least twelve hours in a concentration sufficient to inhibit *Str. agalactiae*. Since this drug has marked activity against many other mastitis organisms, it deserves further trials in intramammary therapy.

SUMMARY

A comparison of penicillin with other drugs for intramammary therapy of bovine streptococcic mastitis disclosed that it was as efficacious as aureomycin or a combination of sulfadiazine and penicillin. Penicillin was significantly better than bacitracin and there was no synergistic action between bacitracin and penicillin.

Streptomycin, formolized gramicidin, and penicillin were only slightly irritating to the udder, while gramicidin, tyrothricin, and sulfonamides were moderately or markedly irritating. Sodium salts of several sulfonamides were markedly irritating and persisted in effective concentration less than twelve hours. Penicillin in an oil-water emulsion vehicle persisted for sixty hours in a concentration inhibitory to *Streptococcus agalactiae*.

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Effects of Various Drugs on Rumen Activity

Clark, speaking before the 1949 meeting of the South African Veterinary Medical Association, recommended a trial of acetic acid in cases of rumen stasis and digestive disorders. The dose tentatively suggested for cows was 50 cc. of glacial acetic acid in 2 liters of water. Addition of 1 lb. of cane sugar appeared to give extra benefit.

He warned against the use of carbamylcholine chloride in cases of rumen stasis due to prussic acid poisoning. Studies on sheep dosed with potassium cyanide showed that injection of carbamyl-choline chloride was followed immediately by total, prolonged paralysis of the rumen, together with acute respiratory and circulatory embarrassment.

As little as 10 Gm. of urea produced acute intoxication in sheep characterized by atony of the rumen and sudden death due to circulatory failure, Clark and coworkers reported. The toxicity of urea was found to depend upon the activity of the rumen flora as determined by the basic ration, sheep on a ration low in protein and sugar being highly susceptible. The toxic symptoms were associated with liberation of ammonia and consequent alkalinity of rumen contents and could be prevented or alleviated by the administration of acid. Other alkalis, such as sodium carbonate and sodium hydroxide, caused rumen paresis, but not the muscular spasms, circulatory collapse, and sudden death observed with urea. The investigators suggested that in the absence of rumen flora adapted to a high rate of nitrogen metabolism, utilization of ammonia is not fast enough, with the result that toxic nitrogenous metabolites, possibly amines, are formed.

Without clinics there is no diagnosis, without diagnosis there is no therapy.—*Med. y Cir. Zoötech. Mexico, May, 1950.*

Eye Cancer May Be Hereditary

A recent experiment by the U. S. Department of Agriculture indicates that heredity is so great a factor in cancer of the eye in animals that it is effective to cull or breed herds free from the disease. In other words, by removing any animal subject to eye cancer from the breeding program, the remaining offspring will be less likely to develop cancer of the eye.

Use of Antibiotics in Diseases of Swine

Penicillin is the most generally used, and is relatively effective, in the gram-positive groups. Streptomycin is effective against both gram-negative and some gram-positive organisms. Resistance of bacteria to both of these antibiotics has been reported.

Aureomycin is effective against most of the organisms susceptible to penicillin and some of the gram-negative bacteria, as well as the rickettsiae and some of the large viruses. There have been no reports of bacterial resistance or of toxicity.

Human self-dosage with penicillin is now a common thing.

It has been suggested that *Monilia (Candida) albicans* may become pathogenic following the destruction of the intestinal bacterial flora by aureomycin or cloramphenicol. This factor, and the stoppage of synthesis of the B vitamins, must be considered. Also, a vaginitis has been reported and is caused by an estrogenic deficiency during aureomycin therapy.

In the treatment of brucellosis with streptomycin and sulfadiazine, the bacteriemia disappeared on treatment, but the foci of infection were still present in many tissues.

Swine dysentery due to vibrios responded to the treatment of aureomycin and streptomycin, but recurrence of symptoms was not prevented, although the severity was generally reduced and the death losses were also reduced.—*J. D. Salisbury, D.V.M. (Indiana), at the Nineteenth Annual Conference for Veterinarians, Columbus, Ohio, June, 1950.*

Stomach worms of sheep may so deplete the host that the animal body is as anemic as it would be if 7 quarts of blood had been lost during a period of six weeks.—*C. A. Herrick, Ph.D., Univ. of Wisconsin.*

Pathogenesis of Canine Glaucoma

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DURING THE past year, glaucoma has numbered high among the eye diseases in the small animal clinic at the Colorado A. & M. College veterinary hospital. This same observation may exist in almost any small animal practice, especially in larger cities where there is a greater congregation of dogs and where conditions are more hectic. For this reason, we believe glaucoma is a timely subject to which more interest and advanced study should be directed.

Today, glaucoma is classified according to its pathogenesis. Eventually this system of classification may be discarded, as more is learned about the cause and various types of glaucoma. Until such time, the present system serves its purpose of describing certain clinical entities. We wish to present this classification and discuss the etiology, symptomatology, and treatment of the various types of glaucoma.

Glaucoma, is a disease of the eye marked by increased intra-ocular pressure resulting in hardness of the eye, atrophy of the retina, cupping of the optic disc, and blindness. The pressure of the normal eye is about 25 mm. of mercury. This is a higher pressure than is found in any other organ in the body. The aqueous humor is believed to influence this pressure as it is constantly being formed and eliminated from the eye. Any condition which upsets this balance, either an increase of production or decrease in absorption, will result in an increased intra-ocular pressure. If this pressure is maintained for a prolonged period, the eye is said to have glaucoma.

Glaucoma may be divided into two major groups; primary and secondary, and these, in turn, broken down into their acute and chronic stages. In primary glaucoma, there have been no previous eye lesions, and it is merely a secondary manifestation of some general body condition or disease entity. Secondary glaucoma, on the other hand, is usually preceded by some eye lesion or lesions such as iritis, swelling of the lens, corneal ulceration, or hemorrhage into the eye.

PRIMARY GLAUCOMA

When a veterinarian diagnoses primary glaucoma, where the clinical picture is quite obvious, he prescribes treatment and may even perform surgery but, in too many cases, treatment is directed almost entirely to the local condition of the eye without further investigation of the patient's history and general attitude. It is thought that the vast majority of patients (human and animal) suffering from this condition also suffer from some greater underlying systemic condition. This underlying condition may be an emotional instability, as in many Wire-Haired Fox Terriers, or it may be an aftermath of a disease like canine distemper. Even in a case of secondary glaucoma, where a local eye condition is the cause, we should not neglect general physical findings, as iritis might very often be just a part of an infection requiring general as well as local treatment. In any event, when we are able to isolate a cause, glaucoma commonly exists as a secondary entity rather than a primary condition within the boundaries of the eye itself.

Primary acute glaucoma is frequently diagnosed in human beings but rarely in animals. However, after more study and close observation of our clinical cases, we may begin to diagnose more of this type. The precipitating factor in this primary acute type seems to be an emotional upset in an individual of the nervous and unstable type. In practice, we know of a number of breeds and many individual animals that can be placed in this category. This type of animal may be the result of inbreeding or just breed inheritance, as we find with

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The author extends sincere appreciation to Dr. George Brown, M.D., Fort Collins, Colo., for his time, interest, and assistance in writing this paper; to Dr. James Farquharson, head, veterinary surgery and clinics, Colorado A. & M. College, for his valuable suggestions and guidance in developing this material; and to Dr. L. C. Moss, professor and head, small animal clinic, Colorado A. & M. College, for his encouragement and constructive criticisms in preparation of this paper.

the Wire-Haired Fox Terriers, especially. Another precipitating cause, especially in this type of animal, may follow dilatation of the pupil by a mydriatic. The symptoms are an acute rise of pressure in the eyes, along with intense pain in the eyes and head. Such pain is said to lead to vomiting and even collapse. We have observed these symptoms in dogs following a very exciting weekend, then upon entry into the hospital with restricted space and forced rest, the condition may be relieved in a day or two. On the other hand, some animals on entry into the hospital may work themselves into a very excitable state and produce such symptoms. Along with the above symptoms, the eyes show an intense ciliary injection, are usually hard on palpation, and the anterior chamber is very shallow. The pupil will be dilated and rigid, and the cornea has a steamy appearance.

If such condition were diagnosed and treatment is directed toward local applications of miotics (1% eserine sulfate or 1% pilocarpine hydrochloride) without a general sedative, results may be poor. Iridectomy may be attempted, and often is the emergency surgery in acute glaucoma in human beings, but without proper rest and sedation results in animals may be less favorable.

In this type of glaucoma, stress the proper care and handling of dogs of the excitable and unstable types, and also the proper treatment directed toward sedation, rest, and nursing care along with local treatment—not local treatment alone. Occasionally, in human medicine, relief of the emotional stress or undue excitement alone will be sufficient for complete recovery.

Another stage of primary glaucoma is the chronic form. This type is usually seen in dogs of the late middle-aged group and seems to run in families and breeds. It is characterized by being extremely chronic and relatively free of pain. The small animal practitioner finds this type easy to diagnose, as the condition is usually well advanced and obvious when it reaches him for medical care. The fact that little or no pain accompanies this type delays the pet owner in bringing the patient to the veterinarian.

At present, the etiology of chronic primary glaucoma is unknown. Since it is more common in certain families and breeds of dogs, the heredity factor again suggests itself. One veterinarian saw a number of cases of glaucoma in the offspring of one Wire-Haired Fox Terrier sire which also suffered from this condition. The occurrence of this type in later life promotes the theory of angiosclerotic changes in the vessels to the canal of Schlemm. If these patients are examined carefully, the majority show changes of this nature. Here, again, the patient would be affected systemically, not just locally in the eyes.

The symptoms of this stage of glaucoma, a slow onset without evidence of pain, are entirely different from those of the acute type. The intra-ocular pressure rises to 35 to 40 mm. of mercury, the globe is greatly enlarged, if it is a young animal, and the episcleral vessels are engorged. In the later stages, the anterior chamber is shallow, the pupil is dilated and irregular, and the iris atrophic. Loss of central vision does not occur until late in the disease. The increased pressure causes an atrophy of the optic nerve with the characteristic cupping of the disc. This latter condition is also believed to be influenced by arteriosclerotic changes in the vessels that supply the optic nerve.

Early treatment of chronic primary glaucoma consists of local administration of miotics along with systemic treatment in which rest, nursing care, and proper elimination are essential. Early surgery may be beneficial. However, atrophy of the optic nerve has already started by the time we see many of these cases. It is important to know when to stop treatment or surgery. Once the patient shows complete blindness, all efforts are in vain and the owner should be advised accordingly. Hereafter, general nursing care and any form of treatment that may aid in the animal's well being are indicated.

SECONDARY GLAUCOMA

When the cause of a rise of intra-ocular pressure is known, the condition is called secondary glaucoma. The majority of cases of glaucoma can probably be classified under this heading, as it includes a number of conditions. Tumors behind the eye may cause secondary glaucoma by obstructing the drainage system of the eye. Also, rapid cateract formation will produce some change in the size of the lens. This change in size may push the iris forward, thereby

obstructing the angle of the anterior chamber and this, in turn, may cause secondary glaucoma. A blow or bruise to the eyeball, causing either hemorrhage in the anterior chamber or setting up an inflammatory process in the iris, is very likely to cause secondary glaucoma. A hemorrhage into the anterior chamber is termed hyphemia and is usually absorbed in a few days to several weeks or longer. If the hemorrhage is slowly absorbed, it may block the exit of fluid from the eye and produce secondary glaucoma. The ciliary body is the most vulnerable part of the eye—wounds, growths, and inflammatory processes here are serious. Interstitial keratitis occasionally occurs in dogs with distemper, and is called distemper eye, blue eye, or any number of lay terms. Along with this interstitial keratitis, inflammatory reaction is common in the iris and also the ciliary body. If there is an increased amount of protein and pus cells in the aqueous humor, the trabecular spaces are easily obstructed—again causing secondary glaucoma. Several months ago, we examined a Cocker Spaniel with absolute glaucoma. By thorough examination, case history, and questioning of the owner we were able to trace back several months to a time when the dog had distemper, accompanied with an eye reaction. Our deductions were that this was a secondary glaucoma brought about by an infectious disease. Such instances may be more common than we realize, the reason for improper diagnoses being poor examination and incomplete history. Corneal ulcer is another factor in the etiology of secondary glaucoma. If the ulcer is extensive, it will give rise to a secondary inflammation of the iris and ciliary body; then, the same process as described with an infectious disease is set up with secondary glaucoma resulting.

The treatment for secondary glaucoma is directed toward the primary cause first and toward aid to the eye or eyes, secondarily. One precaution must be taken in treating secondary glaucoma as a result of acute iritis or iridocyclitis—miotics should not be used. Instead, mydriatics are indicated for the prevention of posterior synechia. In this event, a paracentesis may be performed into the anterior chamber for temporary relief of tension until the inflammatory reaction has subsided. This paracentesis is performed about 2 mm. posterior to the corneoscleral junction, with the needle directed forward. In giving relief of this nature, it must be remembered that the anterior chamber contains only about 0.2 cc. of fluid and undue suction from the syringe may cause displacement and damage to the lens.

Several surgical procedures, such as iridectomy, cyclodialysis, and others, can relieve a glaucoma which does not sufficiently respond to the conservative treatment. The explanations of the benefits of these operations are hypothetical. An iridectomy, for instance, opens the angle at the canal of Schlemm, and aiding drainage seems to be a reasonable explanation. However, in some cases, when poor surgery is performed and the base of the iris is left intact, thereby not enlarging the angle of the cornea, favorable results may still be obtained.

A special case of secondary glaucoma is congenital glaucoma or buphthalmos. It affects the newborn, and the eyeball usually shows some congenital maldevelopment such as persistence of the fibrous tissue instead of trabeculae in the angle of the anterior chamber and occasionally complete absence of the canal of Schlemm. At this age, the cornea and sclera are still quite elastic and there is marked enlargement of the anterior part of the globe. There is tearing of the Descemet's membrane and later cloudiness of the cornea develops, due to edema. If the fundus can be seen, there will be a cupping of the disc. Intra-ocular tension measured in these patients shows a rise up to 60 mm. of mercury. Treatment is not successful, but experimental corrective surgery can be attempted.

The term absolute glaucoma describes the end result of glaucoma regardless of type, either untreated or unsuccessfully treated so that blindness exists and the eye is stoney hard. Symptoms show a cloudy cornea, engorged episcleral vessels, high pressure, and often cataractous lens. Treatment is systemic or geriatric in nature. If such an eye is causing much pain and distress, a retrobulbar injection of 95 per cent alcohol (1 cc.) can be tried. If this does not work, the only way to relieve pain is to remove the eye.

SUMMARY

The classification, etiology, pathogenesis, symptomatology, and treatment that may

be helpful under each classification of glaucoma are discussed. Surgical procedures and enumeration of miotics are not advanced, as that is not the purpose of this paper.

The importance of proper classification is stressed, as this leads to a more complete diagnosis. Following this a more effective means of treatment can be set up and clients can be advised on the prognosis of the case. Lastly, systemic supportive therapy should be used, as a vast majority of glaucoma cases need such attention combined with local treatment.

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See Hope of Eradicating Mexican Foot-and-Mouth Disease

All is quiet on the Mexican foot-and-mouth disease front. Vaccination has virtually been stopped and regular inspections are being made of the 17 million susceptible animals in the danger zone. The fact that there has been no reported outbreak of foot-and-mouth disease since Dec. 23, 1949, has given new hope that Mexico may soon be free of this infection, but responsible officials emphasize that it is too early to tell what has been accomplished.

The current strategy is to inspect every susceptible animal in the eradication area about once a month. Previously, all of the animals were vaccinated four times, excepting those in one district where three-time vaccination was considered sufficient. Immunity produced by the vaccinations is now wearing off and the inspections are aimed at prompt detection and disposal of any animal that may develop the disease. So far this year, nearly 400 animals had symptoms suggestive of foot-and-mouth disease, but in each instance diagnosis has shown foot rot, vesicular stomatitis, hemorrhagic septicemia, or some other infection to be the cause.

With the changeover from vaccination to inspection has come a substantial reduction in personnel needs and operating costs. The working force, which neared 7,000 at the peak of operations, has been reduced to about 3,600, of whom 1,000 are from the United States. The United States share of the expenses—of necessity the lion's share throughout the campaign—is down to a little less than $1 million a month; formerly, the minimum cost was $2 million a month, and in some months it was double that amount.

Another View on Mastitis Control

"The July, 1950, issue of the JOURNAL has just arrived and we were amazed at the statement of Dr. W. J. Gibbons as follows: 'In control of mastitis, good animal husbandry practices are more important than adequate veterinary service. In other words, it is primarily a dairyman's problem.' If this is a fact, there is no justification for selling mastitis products through the veterinary profession exclusively. In this situation, such a policy is not only unjustified but would act as an irritant in the veterinarian's relations with his client. Farmers just do not like to be forced to buy a certain way when other ways are more convenient."

[The above paragraph, taken from a letter addressed to the editor, illustrates again what we have long known, namely: that not all members of the profession view all problems from the same angle.—ED.]

The biting flies of cattle may be handled most effectively by spraying the cows with methoxychlor, pyrethrum, or organic thiocyanates.

Correction

In the legend (p. 291, October JOURNAL) identifying those in the picture taken in the amphitheater of the School of Veterinary Medicine in Havana during the post-convention tour last August, Dean Ricardo Gómez Murillo's (third from left) name was misspelled. Also his two colleagues (to his right) were unidentified. They are (left to right) Dr. Enrique Giménez and Dr. Cándido Gómez Echaso, both of whom are professors in the School of Veterinary Medicine in Havana.

NUTRITION

Bovine Hyperkeratosis

In a feeding experiment which involved 16 lots of 10 calves each, bovine hyperkeratosis became a serious problem. This presented an unusually favorable basis for a study of the relation of feedstuff to bovine hyperkeratosis. The feeding lots were arranged as in fig. 1.

The data recorded suggest the existence of certain elements in feedstuffs which definitely enhance bovine hyperkeratosis and others which seem to have a protective effect against the disease. The enhancing factor(s) seemed most abundant or most active in dehydrated alfalfa and dicalcium phosphate. The protective effects were most noticeable in lots of calves fed corn, a vitamin A carrier, and cottonseed meal. However, it is emphasized that the results are by no means conclusive.

The inciting factor(s) seemed to exist only in the immediate area where the calves were kept. Other calves from the same group, but sold to and fed at a different ranch, failed to develop bovine hyperkeratosis. Also, other cattle on the contaminated premises remained unaffected.

No evidence of contagion was presented. Lots of calves maintained side by side, separated only by a wire fence, and using a common water tank showed a wide variation in degree of pathologic changes. Analysis of feed and water for trace elements, DDT-like compounds, and vitamin A indicated that these substances were present in normal or subtoxic amounts, and were not factors in determining the extent and severity of the disease.

Although there were originally 160 test calves, some died before accurate observations were recorded, and information was incomplete on several others, so that 142 calves are included in this report. They were classified (by pens) according to the presence of bovine hyperkeratosis. Five groups were designated: died, continuously sick, sick and recovered, suspect and recovered, and negative. The distribution of the calves in each of the 16 pens into each of these groups is shown in table 1.

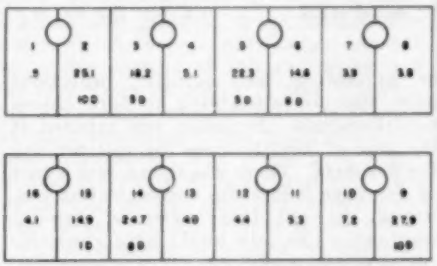

Fig. 1—Arrangement of feeding lots to show the location of water tanks (circle) and severity of bovine hyperkeratosis in the different lots. Upper figure is lot number, second figure indicates rating value for the disease, and the third figure followed by D indicates the number of calves that died.

When making an observation for diagnosis of bovine hyperkeratosis, the following specific symptoms, lesions, or abnormalities were looked for: lacrimation, emaciation, salivation, diarrhea, skin lesions, papilloma of the oral cavity, ulcers on oral mucosa, small circumscribed areas of erythema, crescentic areas of punctate congestion, beginning papilloma, and temperature. The importance of the several symptoms was calculated on a rating system based upon the percentage of incidence. On this basis, hyperkeratosis has a rating of 10, papilloma 6, lacrimation 5, salivation 5, emaciation 2, diarrhea 2, ulceration 2, beginning oral papilloma 1, elevated body temperature 1, and infection about the head 1. The crescent area, red area, and skin warts were so prevalent among all calves that no value was assigned to them.

This is a condensation of the paper which will appear in the January, 1950, issue of the AMERICAN JOURNAL OF VETERINARY RESEARCH, entitled, "The Relation of Feed to an Outbreak of Bovine Hyperkeratosis" by Carl Olson, Jr., D. V. M., M. S.; R. H. Cook, D. V. M., M. S.; and E. M. Brouse, B. Sc.; Lincoln and Valentine, Neb.

On the basis of this rating system, the incidence of the several symptoms has been calculated on a percentage level and is shown in table 2.

In addition to the observations on effects of feed, some of the calves were subjected to treatment, with the thought of allaying

5 Gm. per day for five days. No credit could be given for recovery of 1 calf, and 2 others died soon after treatment.

The conclusion was drawn that penicillin, sulfamerazine, sodium cacodylate, and potassium iodide, in the usual therapeutic doses, had no effect on the course of bovine

TABLE 1—Classification of 142 Calves After Four Months of Bovine Hyperkeratosis Outbreak (April 28 to Sept. 7, 1949)

	Lot															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Died	..	6	2	..	3	..	..	..	8	..	..	..	..	6	1	..
Sick	..	..	5	..	4	1	1	..	1	..	1	..	..	5	5	..
Sick and recovered	..	..	3	3	1	1	3	2	..	6	4	7	5	..	3	2
Suspect and recovered	..	..	..	5	..	..	3	4	..	4	2	..	3	..	..	4
Negative	10	..	..	2	..	..	3	3	..	..	3	3	2	..	..	4
Average ratings	0.5	25.1	18.2	5.1	22.5	14.6	5.9	5.8	27.9	7.2	5.5	4.4	4.0	24.7	14.9	4.1

or preventing the secondary infections more than of attempting to cure bovine hyperkeratosis. Penicillin was injected at the rate of 300,000 units per calf per day for five days. There was then a rest period of five days before the treatment was continued. In all, four series of five-day treatments (20 days total) were given. No response was noted.

TABLE 2—Comparison of Percentage Incidence of Symptoms and Lesions of Bovine Hyperkeratosis in Sick and Negative Calves*

	Sick (112)**	Negative (30)	Rating
Hyperkeratosis	63	0	10
Papilloma	63	0	6
Lacrimation	97	47	5
Salivation	80	15	5
Emaciation	68	50	2
Diarrhea	45	23	2
Ulceration	71	40	2
Begin. papilloma	71	57	1
Temperature	52	27	1
Infection	14	0	1
Crescent area	80	69	0
Red area	67	58	0
Warts	23	20	0

*The rating values are based in part on the difference between these percentage values.
**Number of calves in group.

Sulfamerazine was fed at the rate of 1 gr. per pound of body weight per day. The same five-day pattern of treatment and rest was used, and results were inconclusive.

Sodium cacodylate (10 cc.) was injected intravenously on two successive days and repeated in two weeks. No apparent beneficial results were realized.

Potassium iodide was fed at the rate of

hyperkeratosis, or the secondary infections commonly associated with it, in the cases studied.

The over-all conclusion was that the observations suggest the existence of factors which enhance, and others which protect against, bovine hyperkeratosis. The enhancing or deleterious factor(s) were most noticeable in lots of calves fed dehydrated alfalfa and dicalcium phosphate. The protective factor(s) were most evident in lots fed corn, a vitamin A carrier, and cottonseed meal. Information regarding these trends is inconclusive, and any factors mentioned or present should not be regarded as the cause of bovine hyperkeratosis.

Deficiency of minerals, trace elements, or vitamins could not be linked with the condition. Neither were excessive amounts of toxic minerals recognized.

No evidence of contagion was presented.

None of the treatments used recognizably altered the course of the disease.

When lime is applied to the soil, it ties up manganese so that heavy liming may result in a manganese deficiency.

Calves fed from a pail will get minute amounts of copper and iron which will help in the synthesis of the red blood cells. When a calf nurses, the milk does not come into contact with a metal pail, and this fact may lead to anemia.

Protein Utilization in Sheep Following Starvation

A poor quality ration is the best ration, temporarily at least, for sheep that have been starved for several days. This is the conclusion to be drawn from studies made in South Africa (*J. South Afric. Vet. M. A.*, Dec., 1949), where sheep were subjected to experimental starvation for ninety-six hours. At the end of that period, the total volume of rumen contents was only slightly diminished, although the ingesta became progressively more watery. Sugar fermentation and cellulose digestion were greatly retarded after forty-eight hours. When feeding was resumed, sheep receiving poor feed ate normal amounts immediately, while those given a high protein ration ate sparingly and did not reach normal levels of feed consumption for three to five days. In other words, they regulated their protein intake in accordance with the adaptation of the rumen flora. Cattle were able to make a faster adjustment.

The Relation of Vitamin B_{12} to APF

The term, animal protein factor, was probably first used about 1942 and first appeared in a paper about 1945. At that time, it was not expected that APF would necessarily be considered a single item. It might be multiple in nature. It now appears that such actually is the case. In other words, vitamin B_{12} is a portion of the substance commonly called animal protein factor which may contain other components. It is known, for instance, that liver paste contains two forms of vitamin B_{12} rather than one. It is also known that, in some experiments, significant improvement in growth has been obtained when the APF factor was added, but that addition of vitamin B_{12} produced a less striking effect on growth. In short, the best growth was obtained from the basic material rather than from any of the purified and identified portions thereof or combinations of these fractions.

The use of fish meal in poultry rations has revealed similar responses, the basic, crude material being more effective than several of the known fractions. One common ration compounded from purified items was known to be deficient in two unidentified factors. One of these was present in liver paste dialysate, while both appear to be present in fish meal and dried brewers' yeast.

Another complicating factor in the understanding of this whole program is the so-called whey factor. Biologic assay methods involving *Lactobacillus casei* would indicate that several of these factors remain to be definitely identified.

The general conclusion seems to be that the animal protein factor is a complex composed of vitamin B_{12} and at least two unidentified factors, all of which are required for chick growth.—*Carlson, Miller, Peeler, and Norris, Cornell University, Cornell Nutrition Conference, Nov., 1949.*

The Soil Factor in Human Nutritional Problems

About one hundred years ago, Chatin suggested an inverse relationship between the iodine content of soil and water and the occurrence of goiter in man. During the intervening hundred years, practically no other important direct relationship has been established. The problem of determining the effect of soils upon plant nutrition and animal nutrition is less complex. Even here, the problem is not simple.

The composition of a plant is influenced to a greater degree by soil type than by the fertility of the soil. We have heard much about worn-out soils, whether they be impoverished, leached, or eroded. However, there is evidence to indicate that the age of the soil and the manner in which it has been managed are not always the determining factors. For instance, copper, iron, and manganese are more plentiful in the older Coastal Plain soils of North Carolina than they are in the so-called younger soils.

The problem of soil fertilization revolves around the growth of plants. Only when plants use the nutrient factors of the soil more rapidly than nature can supply them is it necessary to add fertilizer. The question of chemical fertilizer or compost has been widely discussed. To date, results do not indicate any important differences in vitamin content of vegetables grown in compost as compared with commercial fertilizers.—*K. C. Beeson, Ph.D., Ithaca, N. Y., in Nutrition Reviews, Dec., 1949:353-355.*

The critical period in the nutrition of a pig is from weaning to 75 lb. of weight.

EDITORIAL

Conservatism and Disease Eradication

The JOURNAL has repeatedly said that animal disease eradication is successful when it is backed by practicing veterinarians, but that it fails without such backing. With minor variations, this statement has been substantiated by veterinarians in all phases of work—from practitioner to regulatory official.

The ipitial problem, then, would seem to be to enlist the support of practicing veterinarians before a disease-eradication program is initiated. This involves an understanding of the problems of practice as well as those of disease control.

The veterinarian is by nature a conservative individual. Every call made by the practitioner is in response to an immediate need of a client. Appreciating the unpredictability of animal disease problems, the veterinarian in practice analyzes all phases of the case—the present condition of the animal, the reserves stored by virtue of previous nutritive rations, the value of the animal to the owner, the ability and desire of the owner to nurse the patient properly, and the probable effect of weather conditions. Then, allowing for the usual number of deviations from expectations, the prognosis is developed.

Naturally, the prognosis will be conservative. Optimism will develop an expectation which will be achieved only occasionally. Conservatism will engender a feeling of responsibility in the owner to help the patient as much as possible. Pessimism will develop a feeling of despair, and this will result in neglect of the patient and, eventually, in a record of a higher than normal mortality among patients.

In the use of new surgical procedures and therapeutic agents, the wise practitioner is also conservative. The client expects a reasonable degree of success in the use of all procedures and treatments, so the veterinarian uses those which have demonstrated their value in years of use. The new drugs and treatments, used sparingly at the outset, are tried in cases that are almost sure to get well unless seriously upset by treatment, or in cases that are practically hopeless on the basis of treatments previously used.

Carried into the field of disease eradication, the inherent or ingrained conservatism still functions. Programs are sponsored, almost invariably, by enthusiasts. Such persons see results through directed glasses, and often rose-colored lenses, at that. Results which are forecast or calculated mathematically seldom materialize in the field—the unpredictable deviations are always on the lower side, for the interpretations of enthusiasts take advantage of every possible favorable break.

Conservatism prevents the practicing veterinarian from climbing on the bandwagon of every new program submitted. Sometimes, a practitioner is ultra-conservative, or even antagonistic. This is definitely a mistake, and probably indicates that this individual has not accepted the responsibility which goes with the decision. For, the veterinarian who accepts the credit for being the key man in a successful program must also accept the blame for being the key man in the delay or failure of unsuccessful programs.

Acceptance or rejection of a disease-eradication program must be based on more than a personal opinion. In making the decision, the practicing veterinarian must consider not only the immediate but also the long range interests of clients. He must appreciate the effect upon the community as a group of individuals and as a unit. He must weigh the effect upon his practice—work, income, profit—present and future.

While exercising his usual conservatism, the veterinarian must realize that when action is needed, perfection is not expected or demanded. Frequently, an admittedly imperfect program will be accepted *now* in lieu of a more effective or perfect one in the indefinite future. The veterinarian who will not use the means presently avail-

able may learn (too late) that he has been excluded from the plans which actually do go into effect. In other words, the limited services of a partly trained person may be utilized because they are available now, thus by-passing the excellent services of the veterinarian who will make them available when he is ready.

One who does not coöperate has no cause for complaint when others usurp a position which he might have filled to better advantage—had the opportunity been accepted when offered. When public sentiment is aroused to a certain pitch, action is demanded. If the person best trained to render service chooses to ignore or deride the project, a substitute will be used.

We, as veterinarians, must face this problem, realizing that there is a reasonable ground for compromise between conservatism and enthusiasm. Modifications can be made more quickly and more smoothly if all interested persons enter into the deliberations; and diseases will be eradicated more promptly when those who formulate the programs recognize certain basic essentials for the animal owners, the workers in the program, and the communities which are to be served.

Conservatism is a valuable attribute, but it must be exercised open-mindedly and in a spirit of coöperation.

Don't Keep It Secret

Science, official weekly journal of the American Association for the Advancement of Science, has a "News and Notes" column devoted to important events in the various scientific fields. New staff appointments in colleges and institutions, grants and fellowships, major conferences and lectures, and national meetings and elections are reported under this heading.

Were it not for items supplied occasionally by the AVMA, no one would ever know that veterinary medicine qualifies for mention in this column of *Science*—or that veterinarians do anything of news interest to other scientists. The fault lies in failure of the veterinary profession to utilize the publicity mediums that are at its disposal.

Colleges of veterinary medicine and similar institutions can make a worthwhile contribution to professional relations by letting other scientific branches know about their progress. "News and Notes" is one of several outlets which will give consideration to such contributions.

Educational Programs

Continuous long range educational programs to the animal owner are the first essential to stress the soundness and economy of disease control by prevention. Not only practicing and extension veterinarians but all agencies comprising or related to these industries must participate in the educational effort.

The only sound and economical goal of all branches of our animal industry must revolve around disease-free animals on clean premises: keep infection away from the susceptible host, hold parasites at a low level, consider preventive vaccination and treatment as secondary or supporting measures, and plan long range programs for sound disease control.—*C. A. Brandly, D.V.M., Wisconsin.*

Are You a Veterinarian?

In a talk before the Ohio Conference for Veterinarians, Brig. General J. A. McCallam asked: "Is everyone in this audience having a degree of doctor of veterinary medicine a veterinarian?" Conferring of the degree does not *per se* make a man a veterinarian. Pursuing the question from a standpoint of national security and the veterinarian, General McCallam comments, "What have you done in any of the several fields of veterinary medicine for the betterment of your profession or for your local, state, and national veterinary medical associations that proves you worthy of the name? As a veterinarian, and as a citizen, are you contributing to the good of your community, your state, and your nation? Are you an individualist, or do you think and plan what is best for the profession as a whole and how the profession may contribute most to national welfare and security?"

Some of the ways in which the officers in the Veterinary Corps have served were listed by General McCallam:

Safeguarding the health of troops from food-borne sickness and disease; safeguarding the financial intersts of the government; providing a professional veterinary medical service for the animals owned or

used by the Army; adequate veterinary service in occupied countries; training, research, and development in connection with problems on food inspection, particularly as they relate to animal diseases which may also affect man.

During the emergency period, from 1939 through 1946, the Veterinary Corps officers inspected over 27 billion pounds of food of animal origin. Of this amount 5.3 per cent was rejected, and this saved the government over $88 million. A further saving not calculated in dollars is that no serious, widespread outbreak of disease traceable to the issue of unwholesome meat, meat food, and dairy products has occurred among our troops in the past several years.

Most Americans habitually depend upon the many federal, state, and local health agencies to safeguard human health, food, and livestock health, but they have little appreciation of the significance of veterinary food inspection and service in foreign countries.

The destruction of modern transportation facilities, including highways as well as railroads, might well bring the country back to the utilization of animals for military transport. This could happen in our own country as well as in foreign countries. Although most of us think of the Army as being completely mechanized, the military personnel did use 18,000 horses and mules overseas during the last war. While this number is not great, the outcome of certain strategic engagements hinged upon the ability of such animals to perform missions which mechanized equipment could not negotiate. An example in point is the airlift of 8,200 horses and mules over several hundred miles to take them to strategic positions for military operations in the China-Burma-India theater of war.

"The International"

Come the first week of December, the International Livestock Exposition will be celebrating its golden anniversary in the International Amphitheater, 41st and Halsted, Chicago, the site of the old Dexter Pavilion where the first display of American blooded livestock took place. The pavilion, which was named for the famous light harness horse of the nineteenth century, was replaced by the present elaborate building and renamed. Today, both the building and the annual exposition it shelters are famous around the world. "Best the world has ever known" is the universal concession.

This year, breeders from all over the continent will compete for prizes exceeding $100,000. Exhibits of forage, stock judging by 4-H clubs, and a show of light and heavy harness horses have been added to its activities. What "The International," as it is commonly called, means to the veterinarian ought to be self-evident. It is the veterinarian's field of labor on parade.

A State Association Suggests a Brucellosis Eradication Program

[The following resolution was prepared by a committee of three, composed of a research worker and professor, and two practicing veterinarians. It was discussed and adopted by a conference consisting of a large majority of practitioners. It embodies specific and detailed steps and procedures which practicing veterinarians in dairy cattle-raising areas consider economically sound. If the veterinarians who voted for the resolution, and the remaining members of the Association which they represent, will remember these steps and emphasize them in talking to, and dealing with, clients, it will mark the beginning of an era of unparalleled success and prosperity for livestock owners and veterinarians alike. This resolution should focus attention on "brucellosis eradication" instead of a continued program of temporizing with the disease and learning to live with it.—ED.]

Resolution

Whereas, it has become imperative that brucellosis control and eradication be expedited in order to meet the rapidly growing human health requirements for milk and milk products from brucellosis-free herds, and

Whereas, the ravages from Bang's disease are not being adequately or economically coped with under existing laws, regulations and control procedures, and

Whereas, sufficient scientific information and practical experience does exist for the effective and economical eradication of this disease.

Therefore, be it resolved that the Wisconsin Veterinary Medical Association present the following, more detailed program approved in substance during the January, 1948, and January, 1949, annual meetings.

Program

A) That state legislation be revised to create one system or control procedure.

B) That all efforts in Bang's control and eradication be so executed that gains made in the control and eradication process be firmly retained.

C) That the following essential provisions be included in the program:

1) The work be carried out under county area programs and in individual herds in non-area counties.

2) County areas to be qualified after 90 per cent or more of the *bona fide* herd owners sign petitions.

3) Reactors to be disposed of under the following defined schedule:

a) Dispose of all reactors if fifteen per cent or less at time of first test.

b) Dispose of fifteen per cent of total reactors on first retest one year later.

c) Dispose of 15 per cent more reactors two years later.

d) Dispose of all reactors on retest three years after first test.

4) Calfhood vaccination with strain 19 to be required and carried out under program in all infected herds.

5) The only female replacements to be permitted in infected herds are calves under eight months of age and calfhood vaccinated animals under three years of age, the latter to pass negative test if two years of age or older.

6) Indemnity with a State and Federal maximum of $75 for grade and $150 for registered purebred animals to be paid herd owners for condemned animals regardless of whether they are disposed of at time of test or on a deferred basis. The State to assume the payment of the full amount in cases where the Federal Government does not pay.

7) Greater tolerance to be given animals carrying titers from calfhood vaccination where the evidence is conclusive that no infection exists in herd.

8) Adult vaccination to be discontinued.

9) Sanitary procedures to prevent spread of disease into clean herds and to reduce spread of disease within infected herds to be strongly emphasized and required.

10) Cattle sales organizations, livestock dealers, and cattle auctioneers to be licensed to promote observance of laws and regulations pertaining to disease control.

11) Adult replacements into clean herds to be permitted from certified herds and from herds passing complete negative test within six months in addition to negative test of individual within thirty days of sale. In other cases, individual animal to pass negative test, be placed in quarantine by purchaser, and be retested at thirty days.

12) The collection and testing of blood samples, vaccinating, and the performance of the various laboratory and field duties to be done by state licensed qualified veterinarians, veterinarians regularly employed by the State and Federal Governments, and the laboratory staff of the State Disease Control Laboratory.

Be it further resolved that each member of the Wisconsin Veterinary Medical Association be provided with a copy of this resolution to make it possible to give individual and committee aid to the livestock industry in working toward the objective of eradicating this disease, and

Be it further resolved that copies of this resolution also be sent to the state Department of Agriculture, to each of the farm and breed organizations within the state and to each member of the legislature.

LEGISLATIVE COMMITTEE
C. A. Brandly, *Chairman*
J. R. Berggren, W. Wisnicky.

Submitted by the Legislative Committee and passed unanimously by the membership of the Wisconsin Veterinary Medical Association at its regular business meeting, June 20, 1950, at the University of Wisconsin.

Control of Animal Diseases.—Although long realized and often told in the veterinary circle that the successful mastering of animal diseases required world-wide cooperation, the fact had not been crystallized sufficiently in the people's minds to justify the passing of a resolution to that effect until 1949, when the Fourteenth International Veterinary Congress openly urged "the immediate strengthening of this international organization so as to set up *an active world-wide body capable of advising governments in the urgent steps necessary to control animal diseases.*"

Previously, the broadcasting of such a resolution would have been construed as a wild assumption of unbalanced minds, because the health of farm animals has not been thought to be of that much importance.

Horses! Horses! Horses! When you move, whether by live or mechanical horsepower, advise the AVMA office immediately. Only by so doing will your JOURNALS reach you uninterruptedly. The post office WILL NOT forward 2nd class mail.

CURRENT LITERATURE

ABSTRACTS

Circulation in the Avian Kidney

A vinylite resin was used to infiltrate the circulatory system of the avian kidney. When the tissue was then corroded away, the circulatory system was left. A study of such corrosion specimens shows that the hypogastric vein does not have sufficient capacity to accommodate all the blood it receives, unless there is a portal circulation to route some of the blood through the kidney.

A similar study of the arterial system indicates that it also is inadequate to supply the avian kidneys with blood.

On the basis of the work reported, the authors conclude that the avian kidney does have a portal circulation which augments the flow of blood to this organ.—*[Stephen Gordeuk, Jr., and Marion L. Grundy: Observations on Circulation in the Avian Kidney. Am. J. Vet. Res., 11, (July, 1950): 256-259.]*

Newcastle Disease Diagnosis

Tests were conducted to establish diagnostic titer levels for the serum-neutralization (SN) test and for the various applications of the hemagglutination-inhibition (HI) tests. On the basis of the tests reported, it is concluded that experimentally exposed chickens show an earlier demonstrable increase in SN antibody than in HI antibody. It is also evident that an anamnestic response occurs as the result of a second exposure to Newcastle disease virus (avian pneumoencephalitis.—*[E. R. Doll, M. Elizabeth Wallace, and William H. McCollum: Interpretation of Serologic Procedures for the Diagnosis of Newcastle Disease. Am. J. Vet. Res., 11, (July, 1950): 265-271.]*

Infectious Sinusitis in Turkeys

Infectious sinusitis may be transmitted experimentally by several methods of exposure, and the route of inoculation seems to determine whether the disease will be manifested by sinus swelling or by a lower respiratory involvement.

Turkeys were infected by drop instillation into the palatine cleft, instillation into the crop, intramuscular injection, subcutaneous injection, swabbing of the trachea, and contact with sick birds. Depending upon the method of infection, the incubation period varied from less than two weeks to seventeen weeks. However, 37 (77%) of the birds infected in this study came down during the fourth, fifth, and sixth weeks after exposure.—*[A. C. Jerstad, C. M. Hamilton, and E. H. Peterson: Experimental Transmission of Infectious Sinusitis of Turkeys. Am. J. Vet. Res., 11, (July, 1950): 260-264.]*

Treatment of Coccidiosis

When experimental chicks were infected with 100,000 sporulated oöcysts of *Eimeria necatrix* per bird and treated with sulfaquinoxaline, nitrofurazone, or nitrophenide, the following results were observed:

1) Administration of sulfaquinoxaline in the water must begin no later than twenty-four hours after infection and continue for a minimum of five or six days in order to exert its maximum prophylactic benefit.

2) A concentration of 0.03 per cent of the drug in water achieved maximum prophylactic benefit.

3) When nitrofurazone was administered at rates of from 0.005 to 0.03 per cent in the mash, and begun at the time of infection, significantly reduced death losses and a favorably modified clinical picture of the disease resulted.

4) Use of the nitrophenide had very little favorable effect upon the course of the infection.—*[E. H. Peterson and T. A. Hymas: Sulfaquinoxaline, Nitrofurazone, and Nitrophenide in the Prophylaxis of Experimental Eimeria Necatrix Infection. Am. J. Vet. Res., 11, (July, 1950): 278-283.]*

Pasteurella Vaccine for Poultry

The vaccine was prepared from a culture first transferred from a stock tryptose-agar slant to a tube of tryptose broth. After incubation at 37 C. for eight hours, 0.1 ml. of the broth culture was inoculated into the chorioallantoic sac of a 10-day chicken embryo. After incubating at 37 C. for one day, 0.1 ml. of the allantoic fluid was inoculated into a second 10-day embryo. Peak virulence was reached. The vaccine was preserved by lyophilization which is necessary to maintain its potency. The vaccine, when fresh or when lyophilized, protected mice against more than 1,700 lethal doses of *Pasteurella multocida*.—*[G. R. Carter: Studies on a Pasteurella Multocida Chicken Embryo Vaccine. I. The Comparative Immunizing Value of Broth Bacterins and a Chicken Embryo*

Vaccine in Mice. Am. J. Vet. Res., 11, (July, 1950):252-255.]

Eyeworm of Poultry

About 200 eyeworms (*Oxyspirura mansoni*) seemed to be the maximum number which could be contained in the eyes of 1 bird, even though as many as 1,000 infected larvae were fed. Experimentally infected chickens showed less severe symptoms than those found in farm flocks on Oahu.—[*Calvin W. Schwabe: Studies on Oxyspirura Mansoni, the Tropical Eyeworm of Poultry. III. Preliminary Observations on Eyeworm Pathogenicity. Am. J. Vet. Res., 11, (July, 1950): 286-290.*]

Hamster-Adapted NDV

After Newcastle disease virus has been adapted to hamsters and passed through 300 passages, its effect on ferrets, rabbits, and hamsters was similar. The symptoms produced were involuntary motor reactions, excessive salivation from pharyngeal paralysis, general paralysis, prostration, and death. This hamster-adapted virus could not be adapted to the ferret or to the rabbit.—[*Reginald L. Reagan, H. Odette Werner, Dorothy M. Schenck, and A. L. Brueckner: Response of the Ferret and Rabbit to the Modified Hamster-Adapted Newcastle Disease Virus. Am. J. Vet. Res., 11, (July, 1950): 284-285.*]

Newcastle Disease Virus Vaccines

Results are reported on the use of two egg-propagated live virus vaccines. Both produced clinical signs of Newcastle disease (avian pneumoencephalitis) indistinguishable from natural outbreaks. Also, in each instance there was a fall in egg production and the eggs were off-color, malformed, and soft-shelled.

The infective virus was isolated in the yolk of 68.8 per cent of the eggs laid two to ten days after vaccination. Virus was also recovered from the feces and eggshell washings of the vaccinated birds, and all of the virus isolated was pathogenic for susceptible chickens.—[*S. L. Zargar and B. S. Pomeroy: The Effects of Commercial Living Newcastle Disease Virus Vaccines. Am. J. Vet. Res., 11, (July, 1950): 272-277.*]

Klobouk Disease

Only one strain of 17 studied could be adapted to growth and transfer on chicken embryos. Klobouk disease is technically known as encephalomyelitis enzoötica suum non purulenta. Other investigators (Brauner and Ursiny) also succeeded in adapting only one strain of the virus to 11-day-old chicken embryos. This leads to the conclusion that adaptability on chicken embryos is a special and exceptional quality possessed by a very few strains of the virus.

In one experiment, 5 embryos died and 5 remained viable. The 5 which hatched developed ataxia, paralysis, and dyspnoea at 15 to 20 days of age. This was twenty-two to thirty-three days after inoculation.

The lesions of the disease consisted of single lymphocytic infiltration, but no perivascular infiltrations in the hemisphere and in the cerebellum. Brain suspensions from these chicks were transferred to susceptible chicks and produced death in them also. However, back-transferring to pigs was not successful.—[*Harmsch: Experiments in Adapting the Virus of the Klobouk Disease on Chicken Embryos. The Czecho-Slovak Vet. Mag., (Jan., 1950):2-4*]—V.S.

A Survey of Scandinavian Literature

The following items were gleaned from the Nordisk Veterinaermedicin, 1, (1949), by A. G. Karlson, D.V.M., Rochester, Minn.—Ed.

Mastitis Detection.—Electrical conductivity may provide a means for the rapid detection of abnormal milk produced by mastitis-infected cows. The results were consistent with clinical examination and if the field reports are as satisfactory, this test may replace the time-consuming chloride test, according to work by E. Kruse (June, 1949: 465-476).

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Mastitis Caused by Yeast.—Cases of mastitis developing in three herds following infusion of the udder with penicillin proved to be due to yeast cells (torulaceae). Clinical signs lasted for two or three days but the yeast was present much longer. It is believed that the distilled water used to prepare the penicillin solution was contaminated with the yeast, according to Anderson and Jorgensen (December, 1949: 958-966).

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Mastitis Control.—Streptococcus agalactiae was found in 32.6 per cent of 9,916 cows in 298 herds. Other organisms were present in only minor percentages of cases. Romer presents detailed recommendations for control of the disease by full coöperation between practicing veterinarians, laboratories, and herd owners (July, 1949: 509-527).

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Combating Mastitis.—Olsen reports that the fourth and fifth jets of milk are much better suited to culturing than the first, because there is less contamination. He also concludes that addition of crystal violet to the milk reduces contamination but does not interfere with diagnosis. Control of mastitis depends on accurate diagnosis and extensive laboratory cultures have been conducted to standardize an acceptable and reliable technique (April, 1949: 277-308).

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Incubation Period of Brucellosis.—The period

of incubation of brucellosis is inversely related to the length of the gestation period at the time of infection. The earlier the stage of pregnancy, the longer it takes for agglutinins to appear in the blood, says Thomsen (October, 1949: 797-804).

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Acid-Fast Saprophytes in Bovine Abortion.—Acid-fast microörganisms were isolated from the membranes of an aborted calf. They were demonstrated microscopically intra- and extra-cellularily. Although the organism grew well, it could not be identified as any known species. Although not pathogenic, it did sensitize animals to avian tuberculin and thus pointed to the possibility of acid-fast saprophytes being responsible for false positive tuberculin reactions (July, 1949: 528-540).

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Hereditary Infertility in Cattle.—Hypoplasia of the reproductive organs, cystic degeneration of the ovary, lack of sexual desire on the part of the bull, and poor erection or lack of ejaculation all appear to be hereditary factors which interfere with normal reproduction in cattle (October, 1949: 791-796).

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Endocrine Excretion in Nonpregnant Cows.—The urine of normal heifers and nonpregnant cows had an average of 0.18 international units (I.U.) of androgen per liter of urine, as tested by the capon comb method. In animals showing adrenal virilism, the average value was 0.70 I.U. per liter. Because these figures are lower than those obtained by microchemical methods, the authors suggest that, in the cow, the androgens of adrenal origin are excreted as biologically inert steroids or else their effect is inhibited by the presence of neutral steroids (December, 1949:967-974).

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Seminal Hyaluronidase.—Hyaluronidase is found in the testes and semen of many animals. In bull semen, the enzyme increases on standing. Presumably this occurs because of liberation from the sperm and it is probable that the depot of the enzyme is in or under the galea capitis. Since the enzyme seems to exert no effect on the cervical or uterine mucosa, the author believes that hyaluronidase has little effect on fertility, and that there is no reason for adding additional amounts of enzyme to semen diluting fluids for artificial insemination (October, 1949:769-790).

• • •

Semen Dilution and Sperm Viability.—A comprehensive survey of personal work and 44 papers on the subject indicates that viability is maintained better in undiluted semen. Adding egg yolk increases the survival time of sperm but also increases growth of bacterial contaminants. Adding sodium azide has no detrimental effect on the sperm, but does inhibit bacterial growth. A combination of sulfanilamide, sodium azide, and penicillin, together, exerted a marked bacteriostatic effect and controlled the predominant contaminants (September, 1949:643-668).

• • •

Anatoxin in Tuberculosis Diagnosis.—Tuberculosis anatoxin prepared from a broth culture of tubercle bacilli filtered through paper, and then preserved with 4 per cent formalin, proved to be a more specific diagnostic agent than tuberculin. When compared with tuberculin, in cattle, it was found to give reliable results and to elicit reactions less commonly in animals sensitized by other acid-fast bacilli. Further tests are being conducted (August, 1949: 601-612).

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Tuberculin Reaction in the Horse.—The tuberculin test is usually considered unreliable in horses, because of the high percentage of reactions among normal animals. Tuberculosis anatoxin gave few false reactions and missed none of the true positive animals (August, 1949: 581-600).

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Tests for Pregnancy in Mares.—When serum gonadotropin was injected into white mice, in doses ranging from 1.25 to 80.0 I.U., it produced enlargement of the seminal vesicles proportional to the dose. In other words, for the diagnosis of pregnancy in mares, the effect on the seminal vesicles is just as diagnostic as the ovarian changes (December, 1949: 982-984).

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Auto-isoantibodies in Horse Blood.—A factor called *i* was found to be common to red cells of the blood groups A, B, AB, and 0 in horses. The auto-isoantibodies *i* could be detected by using low concentrations of salt in the tests (April, 1949: 312-322).

• • •

Blood Groups in Cattle.—A study of the blood of cattle indicated that these animals had a common factor called *a*. A factor called *b* was present in a varying percentage of cattle from different sources. The authors believe that the factor *b* may be hereditary because it occurs only when one or both parents have it (October, 1949: 750-758).

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Lethal Congenital Ichthyosis in Calves.—A diffuse hyperkeratosis forming thick hornlike scales was present in 9 full-term calves born dead. Histologically, there was thickening of the stratum corneum. The 7 animals of which pedigrees were known had a common great-granddam whose son was sire and maternal grandsire of 5. The authors believed the condition to be due to a single recessive gene (August, 1949: 619-627).

The Veterinarian's Creed.—Let us be honest with ourselves, with our colleagues in the profession, with our clients, and with the general public.—*J. T. Schwab, D.V.M., Wisconsin.*

BOOKS AND REPORTS

Animal Nutrition and Veterinary Dietetics

This book, divided into four sections, deals (1) with the chemical composition and metabolism of nutrients; (2) the various foods and types of foods; (3) the fundamental bases of feeding standards; and (4) the practical feeding of animals of the several species.

The early chapters contain the basic or background information on the numerous nutrient materials, involving chemistry and physiology as well as such practical items as the conservation of grass, forage, and other foods, food storage, and food preparation. The chapter on fundamental bases is especially interesting and instructive as a balanced approach to the feeding problem and the compounding of rations for each species of animal. The chapters on definite rations for cattle, horses, pigs, and other animals are well written, but they involve a bit of transposing because they include feeds and by-products which are not standard in the United States.

The text is written primarily for students of nutrition rather than practicing veterinarians. With this in mind, the book has been extensively rewritten since the preceding edition, and the present volume lists an increased number of references to original papers, reviews, and standard works—all of which will provide supplementary reading for complete understanding of the problems involved.—[*Animal Nutrition and Veterinary Dietetics. By J. T. Abrams. 3rd ed. (1st and 2nd ed. by R. G. Linton.) 521 pages. 8 plates of illustrations. Cloth. Printed in Great Britain. W. Green & Son, 2-4 St. Giles Street, Edinburgh, Scotland. 1950. Price 42 s.*]

The National Formulary

The ninth edition of The National Formulary becomes official on Nov. 1, 1950, and its purpose is the establishment and promulgation of official standards for drugs. The present edition omits 162 items which were official in the preceding volume, while 155 have been added.

Many individual specifications for strength, quality, purity, and identity of previously official drugs have been thoroughly revised and materially improved. The general chapter on injections has been completely revised. Additions to this volume include specifications for the disintegration time of tablets, weight variation standards for tablets, and requirements limiting weight variation in the contents of dry-filled ampules and other containers.

This is the reliable text for veterinarians interested in compounding or mixing some of their own remedies, and a worth-while reference book for those who are interested in the active principles upon which every-day treatment of animals depends.—[*The National Formulary. Prepared by the Committee on National Formulary of the American Pharmaceutical Association. 9th ed. 877 pages. Cloth. Published by American Pharmaceutical Association, 2215 Constitution Avenue, N. W., Washington 7, D.C. 1950. Price $8.00.*]

Diseases of the Pig

The book, divided into 15 chapters, has been amplified by a section on postmortem methods since the preceding edition. About one fourth of the text is devoted to breeds, management, feeding, and general considerations.

The discussion of the diseases has been arranged in the manner of previous editions, with a chapter for the scheduled diseases (reportable) which are anthrax, foot-and-mouth disease, hog cholera or swine fever, and rabies. Next is a chapter on constitutional diseases (nonscheduled), followed by one on deficiency diseases, and a series on local diseases—digestive, urinary, respiratory, circulatory, nervous, and others.

Although the material is arranged in a manner unfamiliar to American practitioners, a reading of the book is instructive and interesting. It presents some new problems, and some old ones from a new angle. Discussions and treatments have been revised, and the text bears out the listing of references, which suggest that the authors have modernized preventive procedures and therapeutic dosages to include articles published in 1948, at which time penicillin and the earlier sulfonamide drugs were being widely used. —[*Diseases of the Pig. By David J. Anthony. 3rd ed. 309 pages. Illustrated. Cloth. Printed in Great Britain. The Williams & Wilkins Co., Mt. Royal and Guilford Aves., Baltimore 2, Md. 1950. Price $4.00.*]

Clinical Laboratory Methods

This book grew from an outline used to teach laboratory methods to medical students and laboratory technicians and is not expected to serve as a clinical pathology text. Instead, it lists in step-by-step detail the tests used in urinalysis, hematology, gastric and duodenal contents, liver function, feces, sputum, cerebrospinal fluid, body fluids, pregnancy, bacteriology, mycology, serology, blood groups, allergy extracts, and electrocardiography, among others.

The author, having selected the one method which he believes to be superior, has concentrated attention on that one test. Each test, concisely discussed, follows the pattern of (1) principles of the test; (2) the various steps as they are performed; (3) calculation of results; (4) interpretation and significance; (5) and the sources of error.

A book prepared primarily for use in human medicine, but which is so concise and so specific that it would serve a useful purpose in the laboratory of any veterinarian interested in expanding

or strengthening this field of diagnosis. Some adaptation would be needed to fit the precise needs of the veterinarian, but such changes should be made easily. If somewhat bulky for everyday use on the laboratory bench, it certainly deserves a place on the library shelf for ready reference in those cases which do not fall readily into the day-to-day classifications.—[*Manual of Clinical Laboratory Methods. By Opal E. Hepler. 4th ed. Cloth. 395 pages (8 in. by 11 in.). 84 tables. 36 figures. 8 color plates. Charles C. Thomas, 301-327 East Lawrence Ave., Springfield, Ill. 1950. Price $8.50.*]

How to Live with a Cat

The author, a woman who has lived with cats both at home and at business (she owned a pet shop for several years), begins with the question, Who Keeps Cats and Why? Martin Luther, Lenin, Victor Hugo, Mark Twain, and liberty-loving George Washington, Thomas Jefferson, and Abraham Lincoln were lovers of cats. Winston Churchill's close friend is a big black cat named "Nelson." Freedom-loving people like cats. Tyrants hate cats.

Fourteen chapters take the reader through a delightful dissertation on the cat—from points to be considered when selecting a kitten to the controversial question, How Smart Is a Cat?

The author bows to the veterinarian when a cat gets sick, but she recommends some home remedies at which veterinarians will look askance. Also, her advice to feed a cat only once a day is to be questioned, as well as her disapproval of spaying cats. Have kittens, she says, they are fun. They are indeed, but sublimely overlooked is the greater question of providing suitable homes for the millions of cats we have, much less the trillions and trillions of cats we would have as a result of uncontrolled reproduction.

If you like cats you will like this book. If you don't like cats, read the book and you will.—[*How to Live with a Cat. By Margaret Cooper Gay. Cloth. 267 pages. Appendix and index. Forward by Norman H. Johnson, D.V.M., and Sidney Coleman, of the American Society for the P.C.A. Simon and Schuster, New York, N.Y., 1950. Price $2.75.*]

REVIEWS OF VETERINARY MEDICAL FILMS

Today's Chicks.—Sound, 16 mm., color, running time about twenty minutes. Prepared and presented by the U. S. Department of Agriculture, Bureau of Animal Industry. Available from the AVMA Motion Picture Library, 600 S. Michigan Ave., Chicago 5, Ill., for a $2.50 handling charge. Also available from state film libraries coöperating with the U.S.D.A. (The list of state film libraries is given in the AVMA Motion Picture Catalog.)

The purpose of the film is to show the importance of the National Poultry Improvement Plan to the production of healthy chicks and their maturing into profitable egg producers. Opening scenes present the magnitude of the poultry industry and the place the Plan occupies in it. An efficient hatcheryman is shown operating under the Plan. Pictured are plate and tube testing for pullorum disease, leg banding, and check testing by the state supervisors. There is also a discussion of the operation of the R.O.P. (Registry of Production). A hatcheryman, buying R.O.P. cockerels, illustrates how this fits into the whole picture of breeding and raising high-producing layers. In conclusion, hatchery sanitation and management are discussed.

Although this film no doubt was designed primarily for poultry raisers, veterinarians will find it interesting. The photography and narration are well done and the film is interesting from beginning to end. Veterinarians not entirely familiar with the operation of the N.P.I.P. and R.O.P. will receive a good, brief review of these plans of which all practitioners should have a good knowledge. The film will also be interesting to students in schools of veterinary medicine and should familiarize them with their responsibility to the poultry industry.

An Outbreak of Tick Paralysis in Cattle.—Silent, 16 mm., color, running time approximately fifteen minutes. Produced and photographed by the staff of the Rocky Mountain Laboratory, U. S. Public Health Service, Hamilton, Mont. Available from the AVMA Motion Picture Library, 600 S. Michigan Ave., Chicago 5, Ill., for a handling charge of $2.50.

Case reports are usually published but this case report is presented through the use of motion pictures. Fortunately, the pictures are good and the titling is well done so that the necessary information is presented, as well as the affected animals. Therefore, this film is an excellent educational production and also interesting to see.

Thirty-one of a herd of 58 yearling cattle were stricken suddenly. All but 1 recovered sufficiently to walk, but 17 were still down after twenty-four hours. All of the symptoms shown by the animals are presented in pictures and titles. Since laboratory tests were negative and other diseases were excluded by the clinical observations, the heavy infestation of ticks was considered the cause of the condition. From 10 to 85 ticks were removed from each animal. After the ticks were removed, rapid improvement was seen and four days later, 55 of the animals in the herd were back on the range. Of interest too is a section in which the experimental collection of ticks is shown.

Because of the excellent photography, ample but concise titles, and the interesting material shown, this should be a popular film with veterinarians and students. Although not designed specifically for showing to laymen, it will be of interest to them and there is nothing in it that excludes it from that use.

THE NEWS

Veterinarians Must Register with Selective Service

President Truman signed a proclamation on October 6 which required physicians, dentists, and veterinarians who qualify under the first and second priorities of the "professional draft" law (*see* JOURNAL, October, 1950, p. 342) to register with local selective service boards on Oct. 16, 1950. Between this date and Jan. 16, 1951, all other veterinarians under 50 years of age, except those who have Reserve commissions, must register. Major General Lewis B. Hershey, director of Selective Service, was authorized to set the registration date for those who were not covered by the October 16 registration. Details of the induction and deferment of veterinarians under this law are also given in the October JOURNAL, p. 342.

RESERVE OFFICERS NOT TO BE CALLED AT PRESENT

According to information received at the time of going to press, sufficient volunteers for Veterinary Corps commissions and active duty have been received by the Department of the Army and the Air Force so that it will not be necessary, at the present time, to call to active duty without their consent Veterinary Corps Reserve officers who had extended active duty during World War II.

Veterinarians volunteering for duty as commissioned officers, who have had at least one year's experience after graduation, enter the Veterinary Corps as first lieutenants. Volunteers with five or more years experience following graduation can be commissioned as captains. Volunteers for the Veterinary Corps *do not* receive the $100 a month "bonus" pay. At the time the "bonus" pay was adopted for the Dental and Medical Corps, the Veterinary Corps did not need additional officers. The objective of the "bonus" pay was to encourage physicians and dentists to stay on, or apply for, military duty. Since there was no shortage of veterinarians in the Veterinary Corps at the time, it was not possible to procure the "bonus" pay for veterinarians although efforts were made by the Surgeon General and the AVMA.

National Emergency Committee Appointed

President Coffee has appointed a National Emergency Advisory Committee, as directed by the Executive Board at their final meeting during the AVMA convention in Miami Beach, Florida.

The specific duties envisioned for this committee are: (1) to be available for counsel to the veterinary medical consultant to the National Security Resources Board; (2) act in advisory capacity in the event any procurement and assignment activity is necessary at the national level; (3) study and advise members and local and state veterinary medical associations on all matters of civil defense and preparedness for disasters resulting from atomic bombings or chemical or biological warfare; and (4) be available for consultation and advice on matters of an emergency nature relating to military activity, civil defense, and mobilization of manpower.

Members appointed are: Drs. W. R. Krill, *chairman* (Ohio), James C. Carey (Iowa), A. K. Carr (Calif.), F. D. Egan (Mich.), W. A. Hagan (N. Y.), R. A. Kelser (Pa.), W. H. Riser (Ill.), J. T. Schwab (Wis.), J. H. Steele (Ga.), R. S. Sugg (Ala.), Asa Winter (Va.), C. D. Van Houweling, *secretary* (Ill.). *Ex officio*: Dr. W. M. Coffee, president, and/or other members of the Board of Governors.

U. S. GOVERNMENT

Marketing Changes for Hog Cholera Antiserum.—The Bureau of Animal Industry of the U.S. Department of Agriculture has recommended the adoption of changes to the Marketing Agreement Order regulating the handling of hog cholera antiserum and hog cholera virus. The recommended changes increased the amount of the assessments to be paid by wholesale handlers and revised the method of prorating the expenses due to increased costs of administration of the Order.

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Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S. Bureau of Animal Industry are reported as of Sept. 18, 1950, by Mr. W. A. DeVaughan, personnel officer.

RESIGNATIONS*

Carmelo Alemar, San Juan, P. R.
Neville L. Astle, Fort Worth, Texas.
Edward Baker, East St. Louis, Ill.
Robert A. Barton, Mexico City, Mex.
Neal C. Batson, Raleigh, N. Car.

*This list does not include 35 resignations from Wisconsin.

Maurice P. Brimmer, Mexico City, Mex.
Morley H. Cook, Topeka, Kan.
Wesley J. Crenshaw, Mexico City, Mex.
James H. Cutler, South St. Paul, Minn.
John W. Finley, Mexico City, Mex.
Frank A. Flipse, Topeka, Kan.
Mark L. Greenberg, New Haven, Conn.
Leslie W. Jones, Los Angeles, Calif.
Miss Nancy D. Kadlec, Springfield, Ill.
Ralph V. Kelling, Denver, Colo.
Jack A. King, Phoenix, Ariz.
George W. Klover, Topeka, Kan.
Isaac Levine, Mexico City, Mex.
Peter Lustig, Sacramento, Calif.
Henry N. Makinson, Jr., Mexico City, Mex.
Fred M. Murdock, St. Paul, Minn.
Chasteen D. Murphy, Mexico City, Mex.
Frederick W. Rea, Richmond, Va.
Charles W. Reed, Albuquerque, N. M.
Rudolph Schiefelbein, Jr., San Antonio, Texas.
Ralph T. Scott, Mexico City, Mex.
Willard O. Tucker, Fort Worth, Texas.
John E. Turner, Mexico City, Mex.

TERMINATIONS

Werner F. Hillstrom, Madison, Wis.
Richard J. Knilans, Madison, Wis.
Winston A. Malmquist, Amsterdam, Holland.
Robert J. Marshall, Madison, Wis.

RETIREMENTS

Walter C. Alvey, Fort Worth, Texas.
Fred A. Barber, Boise, Idaho.
Harold J. Boyce, Kansas City, Kan.
James H. Cooper, Fort Worth, Texas.
Walter C. Dendinger, Atlanta, Ga.
James R. Donnelly, Boston, Mass.
Lewis E. Epple, New York, N.Y.
Edgar A. Grubb, Helena, Mont.
Jacob James Jones, Baltimore, Md.
Ernest E. Lent, Columbia, S. Car.
Philip S. McLaughlin, Los Angeles, Calif.
Guy W. Ornduff, Wichita, Kan.
Frank H. Painter, Louisville, Ky.
Walter J. Palmer, Indianapolis, Ind.
Elmer B. Parker, Nashville, Tenn.
Roy V. Rafnel, St. Louis, Mo.
Benjamin F. Rostetter, Fort Worth, Texas.
Walter W. Shartle, Chicago, Ill.
Leonard S. Smith, Miami, Okla.
Joseph W. Venable, Montgomery, Ala.

TRANSFERS

Philip N. Cazier, from Mexico City, Mex., to Topeka, Kan.
Erston S. Cox, from Mexico City, Mex., to Phoenix, Ariz.
Arthur B. Crawford, from Beltsville, Md., to Holland.
Robert N. Earhart, from San Antonio, Texas, to New York, N.Y.
Oswald L. Osteen, from Amsterdam, Holland, to Washington, D.C.

DEATH

Ira W. Edwards, Montgomery, Ala.

WOMEN'S AUXILIARY

The President of the Women's Auxiliary.—Mrs. Dennis Coughlin, Knoxville, Tenn., the president of the Women's Auxiliary to the AVMA, took office at the Miami Beach meeting in August. After graduating from Columbia University in New York City, Mrs. Coughlin taught chemistry and nutrition at the College of Industrial Arts, Denton, Texas. Later, she returned to Columbia for a masters degree. While teaching at the University of Tennessee, she met Dr. Dennis Coughlin and they were married in 1925. They have one son, Dennis, Jr., who is in medical school at the University of Tennessee.

Mrs. Dennis Coughlin

Joining the Women's Auxiliary to the AVMA in 1932, she served as second vice-president before becoming president-elect, and then president. Mrs. Coughlin helped to organize the Women's Auxiliary to the Tennessee Veterinary Medical Association. She has been active in civic organizations, serving as vice-president of the Knoxville branch of A.A.U.W., president of the Federated Women's Club and of the City Association of Women's Clubs, and as a member of the board of directors of the Knoxville Y.W.C.A.

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Reports of Miami Meeting.—Copies of the report of the House of Representatives are being sent to all of the delegates to the House, and copies of the report of the business session are

being sent to the president of each state women's auxiliary.

s/(MRS. DENNIS) ESTHER COUGHLIN, *President.*

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Colorado Auxiliary.—The Women's Auxiliary to the Colorado Veterinary Medical Association met at the Shirley Savoy Hotel on Sept. 28-29, 1950. Entertainment included luncheon, cards, cocktails, and the banquet.

s/MRS. LLOYD C. MOSS, *Secretary.*

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Northern Illinois Auxiliary.—The Women's Auxiliary to the Northern Illinois Veterinary Medical Association met at the Faust Hotel in Rockford on September 27. After the business meeting, members enjoyed canasta and bridge, luncheon at Schrom's, and the annual banquet. Members of the Reception Committee were Mrs. L. M. Darst, Princeton; Mrs. H. P. Wessels, Genoa; and Mrs. H. G. Hoyt, Dundee.

s/MRS. A. A. LEGNER, *Secretary.*

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Michiana Auxiliary.—The Women's Auxiliary to the Michiana Veterinary Medical Association met at the Hotel LaSalle, South Bend, on Sept. 14. After the business meeting, members and guests played cards. The door prize was won by a new member, Mrs. A. C. Dufour of LaGrange.

s/MRS. R. W. WORLEY, *Publicity Representative.*

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Pennsylvania Auxiliary.—The Women's Auxiliary to the Pennsylvania Veterinary Medical Association met at Galen Hall in Wernersville, on Oct. 4-6, 1950. The interesting and varied program included luncheon at the Pastoral Pool, a Pennsylvania Dutch dinner, square dancing, hay ride in the mountains, trips to the Berkshire Knitting Mills, the Skyline Drive, and the Chinese Pagoda, shopping, cards, golf, swimming, and motion pictures.

s/MRS. J. J. THOMAS, *Secretary.*

APPLICATIONS

The listing of applicants conforms to the requirements of the administrative by-laws—Article X.

First Listing

ARIAS, C. A.
Calle A-268, Almandares, Havana.
V.M.D., University of Pennsylvania, 1910.
Voucher: A. M. Morales.

CHADWICK, VERNON D.
P.O. Box 916, Jackson, Miss.
D.V.M., Texas A. & M. College, 1938.
Voucher: J. A. Randle.

COOPER, GEORGE W.
Box 25, Tuskegee Institute, Ala.
D.V.M., Colorado A. & M. College, 1918.
Voucher: J. W. Harrison.

DAVIS, ALVA B.
307 S. Dowling Ave., Donalsonville, Ga.
D.V.M., University of Georgia, 1922.
Voucher: C. C. Rife.

DEMILLY, JOHN W., JR.
Box 994, Homestead, Fla.
D.V.M., Alabama Polytechnic Institute, 1939.
Voucher: V. L. Bruns.

GARRETT, LA RUA
1701 E. 5th St., P.O. Box 348,
Panama City, Fla.
D.V.M., Alabama Polytechnic Institute, 1937.
Voucher: V. L. Bruns.

GUNN, WILLIAM
Box 217, Varnville, S. Car.
D.V.M., Alabama Polytechnic Institute, 1934.
Voucher: R. A. Mays.

ISBELL, R. G.
Box 323, Gadsden, Ala.
D.V.M., Alabama Polytechnic Institute, 1926.
Voucher: I. S. McAdory.

JAMES, EDMUND H., JR.
1635 Rickenbacker Rd., Baltimore 21, Md.
D.V.M., Alabama Polytechnic Institute, 1942.
Voucher: J. D. Gadd.

JOHNSON, SAMUEL T.
816 Broad St., Jacksonville, Fla.
D.V.M., University of Georgia, 1933.
Voucher: V. L. Bruns.

LAGARDE, RAFAEL
Calle 23, No. 802, Vedado, Havana.
V.M.D., University of Havana, 1921.
Voucher: A. M. Morales.

LORD, MAJOR WILLYS E., V. C.
1321 Lady St., Columbia, S. Car.
D.V.M., Ohio State University, 1937.
Vouchers: E. D. Clawson and D. C. Frederickson.

LUBIAN, JOAQUIN
Banos 354, Vedado, Havana.
V.M.D., University of Havana, 1934.
Voucher: A. M. Morales.

MOOD, BERNARD F., SR.
220 E. Gordon St., Savannah, Ga.
D.V.M., Texas A. & M. College, 1936.
Voucher: C. C. Rife.

NELSON, CLIFFORD L.
Jewell, Iowa.
D.V.M., Iowa State College, 1939.
Voucher: F. B. Young.

NEUBAUER, CAPT. LLOYD J., USAF, V.C.
1701st Med. Group, Great Falls AFB, Great Falls, Mont.
D.V.M., Colorado A. & M. College, 1944.
Vouchers: R. R. Miller and W. O. Kester.

M. PLASENCIA, VIRGILIO
Calle H No. 561, Vedado, Havana.
V.M.D., University of Havana, 1939.
Voucher: A. M. Morales.

ROBERTS, G. I.
Ivor, Va.
D.V.M., Ontario Veterinary College, 1940.
Voucher: H. K. Royer.

ROUSSEAU, JOHN R.
1421 N.W. 24th Ave., Miami, Fla.
D.V.M., Michigan State College, 1949.
Voucher: V. L. Bruns.

SHEPHERD, HARRY E.
1515 37th St., Sacramento 16, Calif.
D.V.M., Colorado A. & M. College, 1926.
Voucher: C. S. Travers.

TAYLOR, JULIAN B.
Elba, Ala.
D.V.M., Alabama Polytechnic Institute, 1944.
Voucher: I. S. McAdory.

Second Listing

BECKMAN, C. HERMAN, 4411 Chippewa St., St. Louis 16, Mo.

BENNETT, GEORGE R., 2108 Potomac Ave., Pittsburgh, Pa.

BUSH, NEILL E., 905 9th St., Elkins, W. Va.

COLLINS, WILBER G., Box 1232, Hanover, N. H.

CONNELL, JAY R., 823 Laclede, Sheridan, Wyo.

COXON, EARL N., Box 474, Wellesley, Ont.

FAUKS, WILLIAM K., 2910 N. W. 23rd, Oklahoma City, Okla.

HILL, JAMES K., Titonka, Iowa.

LARSON, EMIL V., Evansville, Minn.

MAHER, WALTER D., Fulda, Minn.

MILNE, FRANCIS J., 639 Mathews St., Fort Collins, Colo.

PEIGH, DONALD R., 8256 S. Ashland Ave., Chicago, Ill.

ROSS, JACK B., Meadowbrook Rd., Jackson, Miss.

SAITO, ROY, Leduc, Alta.

SELLE, OMAR O., Marshfield, Mo.

SERLING, MAURICE E., 6 Weaver St., Larchmont, N.Y.

SMITH, CHARLES L., 707 W. Clinton St., Huntsville, Ala.

SMITH, FRED H., R.F.D. 13, Boulder Crest Dr., Atlanta, Ga.

STEWART, WYNON C., Tylertown, Miss.

THOMAS, JULIAN H., Box 658, 795 S. Main St., Lockhart, Texas.

1950 Graduate Applicants

First Listing

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative By-Laws to members in good standing of junior chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

Iowa State College

BELL, LEROY H., D.V.M.
1316 W. Locust St., Davenport, Iowa.
Vouchers: F. K. Ramsey and R. A. Packer.

BIERSCHWAL, CLARENCE J., JR., D.V.M.
103 Temple, Excelsior Springs, Mo.
Vouchers: F. K. Ramsey and M. A. Emmerson.

HALL, ROBERT E., D.V.M.
Albany, Mo.
Vouchers: M. W. Sloss and W. A. Greene.

WINEGARDEN, RICHARD L., D.V.M.
1106 Sycamore St., Waterloo, Iowa.
Voucher: F. B. Young.

Ontario Veterinary College

MACKAY, ALVIN R., D.V.M.
Apt. 11, 343 Prince St., Truro, N.S.
Voucher: R. McG. Archibald.

University of Pennsylvania

BELLOFF, GEORGE B., V.M.D.
153 N. Munn Ave., East Orange, N.J.
Vouchers: D. G. Lee and F. E. Lentz.

GREEN, CASPER W. J., V.M.D.
212 N. Eagle Rd., Havertown, Pa.
Vouchers: D. G. Lee and F. E. Lentz.

Second Listing

Iowa State College

HOLLEN, JAMES M., D.V.M., New London, Iowa.

Ontario Veterinary College

BRYDGES, WILLIAM G. J., D.V.M., I.O.O.F. Hall Bldg., Neepawa, Man.

CAMPBELL, DUNCAN, D.V.M., King, Ont.

State College of Washington

STIRLING, CHARLES O., D.V.M., 5112 S. East 74th, Portland 6, Ore.

AMONG THE STATES AND PROVINCES

California

Death of Charley White.—The announcement of Dr. Charles Andrew White's death at his home in Hollywood, Calif., on Feb. 19, 1950, recalls the life and work of a towering figure in the fields of canine and feline medicine, captive wildlife, and organized dog fancy, for Charley White, as he was affectionately called by the alumni of the Chicago Veterinary College where he taught small animal medicine and surgery for many years, was a pioneer. He was the first to occupy a chair of small animal medicine in American colleges and was the founder of one of the first exclusively canine and feline hospitals, not to mention that he won considerable fame in the wild animal field through his long connection with the Lincoln Park Zoo. As the story went, among his Illinois colleagues, he seemingly abandoned a large practice (1920) in the heyday of his career to retire com-

fortably in southern California. More nearly true, as his close friends knew, he went to Los Angeles to look after the wild animals of the growing motion picture industry and the pets of its celebrated personnel. The stars of the silent screen were his first clients in his new locale.

Born into a family of the upper social bracket at Auchtermuchy, Scotland, on Oct. 4, 1867, he settled in Chicago in 1885, graduated at the Chicago Veterinary College in 1894, and shortly joined its teaching staff in the capacity stated above. One of his extra-curricular ambitions was the development of dog clubs and bench shows on a local and national basis, meanwhile earning a permanent place for veterinarians in dog and cat fancy of the Middlewest and beyond.

Arburua and Baxter (*California Vet.*, March-April, 1950), writing at some length on the life of Dr. White, show that his thirty-year sojourn on the Pacific Coast was characterized by his original ambition to carry on after the usual age of retirement and regardless of his independent means. His death removed more than a distinguished member of the profession, because his skill, decorum, and calm dignity brought a great deal of honor and respect for veterinary medicine in the higher echelon of the social realm.

Colorado

State Association.—The annual fall meeting of the Colorado Veterinary Medical Association was held on Sept. 28-29, 1950, in the Empire Room of the Shirley Savoy Hotel in Denver. The program follows.

Dr. W. W. Armistead, professor, veterinary medicine and surgery, A. & M. College of Texas, College Station: "Mechanics in Surgery," and "Problems of Small Animal Practice."

Dr. John D. Ray, director, Diagnostic and Biological Laboratories, the Corn States Serum Co., Omaha, Neb.: "Differential Diagnosis in Swine Practice."

Dr. C. D. Van Houweling, director of professional relations, and assistant executive secretary of the AVMA, Chicago: "The AVMA Organization," and "AVMA Participation in National Planning."

Dr. Floyd Cross, dean, Division of Veterinary Medicine, Colorado A. & M. College, Fort Collins: "Report on Veterinary Medical Education at Colorado A. & M. College."

Dr. James Farquharson, professor of surgery, and head of the veterinary hospital, Colorado A. & M. College, Fort Collins, presented the motion picture "Surgical Procedures."

Dr. O. R. Adams, associate professor, veterinary medicine, veterinary hospital, Colorado A. & M. College: "Forage Poisoning in Cattle." Dr. John W. Harrison, Longmont, led the discussion of this paper.

Colonel Wayne O. Kester, USAF, V. C., Office of the Surgeon General, Washington D.C.: "Military Importance of the Veterinary Medical Profession."

Dr. V. D. Stauffer, Arvada, led an open forum on general practice, with all speakers participating, at a luncheon meeting.

Dr. O. W. Olsen, professor and head, Department of Zoölogy, Colorado A. & M. College: "Animal Parasitism in Colorado."

s/JOHN W. HARRISON, *Secretary.*

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Dr. Gassner Studies Effect of Hormones on Reproductive Cycle in Ewes.—Dr. Frank X. Gassner (COL '37) professor of endocrinology at the Colorado A. & M. College experiment station at Fort Collins, directed and carried on a series of tests with hormones and their effect on the reproductive cycle in ewes. The complete report of the experiment is not yet available, but preliminary indications are that administration of gonadotrophin at four weeks after lambing resulted in the production of a second crop of lambs within the year.

According to an estimate from Armour & Co., who sponsored the research work, it may enable sheep breeders to realize an extra profit of $15 to $20 per year on each ewe.

The present experiments are regarded as preliminary and they leave several questions unanswered, notably: the effect of this hormone treatment on milk production, on future lamb production, and on the ultimate value of the treated ewes.

Idaho

State Association.—The annual summer meeting of the Idaho Veterinary Medical Association was held at the Shore Lodge in McCall, June 12-13, 1950. The scientific program follows:

Dr. T. R. Myers, U.S. Bureau of Animal Industry, Boise: "Progress of Foot-and-Mouth Disease."

Dr. H. S. Cameron, School of Veterinary Medicine, Davis, Calif.: "Diseases of Reproduction in Dairy Cattle" and "The California Veterinary Clinic."

Dr. R. L. Burkhart, Lederle Laboratories, Pearl River, N.Y.: "Aureomycin Therapy in Veterinary Medicine" and "Rabies and Canine Distemper Viruses Modified by Chicken Embryo."

Dr. H. F. Meyers, State Livestock Disease Control Laboratories, Boise: "Disease Control Laboratory."

Dr. J. Micuda, Kindness Hospital, Phoenix, Ariz.: "The Role of Whole Blood Transfusion in Veterinary Medicine" and "Small Animal Diseases."

Dr. R. C. Derrer, Meridian: "A Mastitis Control Program."

Dr. W. J. Ewing, Boise, was chairman of a question and answer session.

The motion pictures "Challenge—Science Against Cancer," "Local Anesthesia in the Canine," and "Ye Old and the New in Medical Research" were shown.

New officers of the Association are Drs. L. V. Ruebel, Jerome, president; W. E. Cameron, Nampa, vice-president; and A. P. Schneider, Boise, reelected secretary-treasurer.

Dr. L. V. Ruebel was toastmaster at the annual banquet at the Shore Lodge.

s/A. P. SCHNEIDER, SECRETARY.

Illinois

Northern Association.—The Northern Illinois Veterinary Medical Association met on Sept. 27, in the Hotel Faust, Rockford. The following program was presented.

Dr. John Dewar, president, Iowa State Veterinary Medical Association, Cherokee: "Diseases and Treatment of Feedlot Cattle."

Dr. Wayne H. Riser, Skokie: "Small Animal Practice."

Dr. G. T. Woods, Urbana, was moderator of a panel on "Brucellosis." Other panel members were Drs. H. P. Wessels, Geneva; George W. Jensen, Antioch; and herdsmen Ralph Johnson, Savage Farm, LaFox; and Kenneth Peissig, Cornell Farm, Winfield.

Dr. E. A. Woelffer, Oconomowoc, Wis.: "Sterility of Dairy Cattle."

After the scheduled program, the audience joined in an impromptu discussion of current pig problems.

Officers elected at the meeting were Drs. H. E. Held, Freeport, president; A. A. Legner, Sandwich, president-elect; Dale Stephenson, Rockford, secretary-treasurer.

Evening entertainment consisted of the annual banquet and a talk by Mr. Fred Jansen, Sycamore, "Our Obligation to Youth."

s/A. A. LEGNER, *Secretary.*

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Chicago Association.—Col. Oness H. Dixon, Jr., discussed the military situation of today at the Sept. 12 meeting of the Chicago Veterinary Medical Association in the Palmer House. Dr. R. J. Cyrog was chairman of a panel that reviewed some of the topics discussed at the Miami Beach Session of the AVMA. Other panel members and their subjects were: Drs. E. C. Saunders, "Clinical Aids"; J. K. Bone, "Distemper"; C. L. Miller, "Heartworm"; and W. A. Young, "Rabies." A discussion from the floor followed this presentation.

Dr. A. G. Misener was appointed delegate to the Illinois Association.

s/ROBERT C. GLOVER, *Secretary.*

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Dr. Barto Joins Faculty of College of Veterinary Medicine.—Dr. Paul B. Barto (UP '46), formerly instructor and research assistant, Oregon State College, has been appointed instructor in the Department of Veterinary Pathology and Hygiene at the University of Illinois College of Veterinary Medicine. While at Oregon State College, Dr. Barto was awarded the M.S. degree. He is a member of the AVMA and of the Oregon State Veterinary Medical Association.

Indiana

Short Course.—Purdue University sponsored its thirty-eighth annual short course for veterinarians on Oct. 4-6, 1950, with the program highlighting subjects immediately applicable to everyday general practice. Guest speakers and their subjects follow.

Dr. R. W. Elrod, state veterinarian, Indianapolis: "Animal Disease-Control Situation in Indiana."

Dr. L. E. Burney, Indiana State Board of Health, Indianapolis: "Consumers' Health Protection."

Dr. E. R. Frank, Department of Surgery and Medicine, Kansas State College, Manhattan: "Clinical Veterinary Medicine" (with illustrations).

Dr. W. R. Hinshaw, Camp Detrick, Frederick, Md.: "Some Observations on Poultry Problems."

Dr. Clarence R. Cole, College of Veterinary Medicine, The Ohio State University, Columbus: "Pathology of Reproduction."

Dr. M. G. Fincher, New York State Veterinary College, Cornell University, Ithaca: "Clinical Features of Reproductive Problems."

Dr. D. C. Wood, Greensburg: "A Specialized Practice on Cattle Sterility Problems."

Dr. A. V. Nalbandov, Department of Animal Science, University of Illinois, Urbana: "Problems of Swine Reproduction."

Dr. S. H. McNutt, Department of Veterinary Science, University of Wisconsin, Madison: "Swine Diseases."

Dr. C. D. Van Houweling, assistant executive secretary of the AVMA, addressed the group at the banquet Thursday evening on "Affairs of the American Veterinary Medical Association."

Drs. M. G. Fincher and E. R. Frank were in charge of large animal demonstrations; Dr. S. H. McNutt, of swine demonstrations; and Dr. W. R. Hinshaw, of sheep and poultry demonstrations.

Subjects discussed by members of the Purdue faculty included foot-and-mouth disease, external parasites, late information on poultry diseases, extension services of veterinary department, swine diseases, diagnostic findings of the past year, artificial insemination, and problems of reproduction.

s/L. M. HUTCHINGS, *Chairman, Short Course Committee.*

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Michiana Association.—Twenty-seven members of the Michiana Veterinary Medical

Association and their wives and guests met in the Bronzewood Room of the Hotel LaSalle, South Bend, on Sept. 14 for their regular monthly meeting. After a short business session, President Carver introduced guest speaker Dr. Leslie M. Hutchings, Department of Veterinary Science, Purdue University, who spoke on "Swine Diseases."

s/R. W. WORLEY, *Secretary.*

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Dr. Hutchings Named Head, Department of Veterinary Science.—Dr. L. M. Hutchings (MSC '40), who has been acting head of the Department of Veterinary Science at Purdue University for several months, has been named head of the Department. Dr. Hutchings succeeds Dr. C. R. Donham, who asked to be relieved of administrative duties because of ill health. Besides serving as head of the Department of Veterinary Science, Dr. Hutchings becomes director of the Animal Disease Diagnostic Laboratory there; chairman of the Indiana Veterinary Examining Board, and *ex officio* member of the Indiana Livestock Sanitary Board and the Indiana Commission on Animal and Poultry disease. He has been on the Purdue staff since 1942 and has become widely known through his research work in swine brucellosis.

Dr. Donham, who has been head of the Department since 1940, will continue on the staff as professor of veterinary science and will devote his time to research work in the field of animal health. During his ten years in the Department, he has developed an outstanding research program at the University.

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Sixth District Association.—The Sixth District Veterinary Medical Association of Indiana met at the Old Trail Inn south of Greencastle on Sept. 14, 1950. Dr. Joe Green of the state Bureau of Animal Industry, discussed some of his experiences with diseases of swine in Indiana during recent months. Members joined in a discussion of their swine problems after Dr. Green's talk.

s/J. L. KIXMILLER, *Resident Secretary.*

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Northeastern Association.—On September 12, the Northeastern Indiana Veterinary Medical Association met in Fort Wayne. Dr. and Mrs. Harry Hogan told of their experiences in Honolulu, Japan, and China, this year. A round table discussion of swine diseases completed the program.

s/J. L. KIXMILLER, *Resident Secretary.*

Iowa

Nutrition Conference.—More than 250 veterinarians registered for the first Nutrition Conference for Veterinarians sponsored by the Feed Institute, Western Grain and Feed Association, Iowa Veterinary Medical Association, and the Iowa State College on Sept. 7, 1950, in the Curtiss Hall at Iowa State College, Ames. Dr. H. D. Bergman, dean of veterinary medicine and director of the Veterinary Research Institute at the College, and Mr. Floyd Andre, dean of Agriculture and director of the Agricultural Experiment Station and Agricultural Extension Service at the College, opened the meeting. The program follows.

Dr. Damon Catron, associate professor of animal husbandry, Iowa State College: "New Developments in Swine Nutrition."

Dr. Frank Thorpe, professor of animal pathology, School of Veterinary Medicine, Michigan State College, East Lansing: "Nutrition in Relation to Enteritis in Swine."

Dr. Gustav Bohstedt, professor and chairman, Department of Animal Husbandry, University of Wisconsin, Madison: "Modern Essentials in Dairy Cattle Nutrition."

Dr. Elton Johnson, associate professor of poultry husbandry, Iowa State College: "Poultry Nutrition."

Mr. C. C. Culbertson, Department of Animal Husbandry, Iowa State College: "Nutrition of Beef Cattle and Sheep."

Mr. Hugh Kelley, chairman of the Feed Division, Western Grain and Feed Association: "Impressions and Comments."

Dean Bergman was moderator of a panel which answered questions from the floor. Other panel members were Drs. Damon Catron, Frank Thorpe, Elton Johnson, Gustav Bohstedt, and Mr. C. C. Culbertson.

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East Central Society.—Fifty-six veterinarians from 21 counties attended the September 14 dinner meeting of the East Central Iowa Veterinary Medical Society at the Hotel Montrose in Cedar Rapids. Dr. W. P. Switzer, Veterinary Diagnostic Laboratory, Iowa State College, Ames, spoke on "Recent Calls at the Veterinary Diagnostic Laboratory." Dr. Switzer said that among the 91,500 specimens received annually at the Laboratory, many arrived in poor condition due to improper packing, delayed mail service, and hemolysis due to errors in collecting and packing. Drs. H. N. Strader, Marion; Joe W. Giffee and Leroy A. Pierce, Cedar Rapids; and John B. Bryant, Mount Vernon, led the discussion of this paper.

Dr. V. M. Reinhart, Norway, gave a comprehensive report of the Nutrition Conference held at Ames this summer. Drs. George P. Shindel, DeWitt; B. C. Lowther, Hopkinton; John W. Carey, West Liberty; Darrell T. White, Williamsburg; C. L. Crider, Elkader; and F. J. Crow, Iowa City, also discussed the nutrition conference.

The nominating committee, composed of Drs. E. C. Howe, Iowa City; Wm. M. Lynch, Cedar Rapids; and N. R. Waggoner, Olin, presented the following for 1950-1951 officers: Drs. B. C. Lowther, Hopkinton, president; Virgil M. Reinhart, Norway, vice-president; and Wayne H. Thompson, Earlville, secretary-treasurer. This slate was elected unanimously.

Maryland

A Family Dog Lost.—Our 9-year-old female Collie, to whom my family is deeply attached, disappeared September 12. Although we have advertised in the newspapers and on the radio, we have had no trace of her. It may be that some veterinarian in this area, or across the country, will be asked to treat her, because of a certain recurring difficulty. If so, we hope he will contact us immediately, at our expense.

s/DONALD R. LYNCH, D.V.M.

[For further details, see adv. p. 46, under "Want Ads, Miscellaneous."—Ed.]

Massachusetts

State Association.—The September 20 meeting of the Massachusetts Veterinary Association was held at the Highland Hotel, Springfield. Speakers at the meeting were Drs. Edwin A. Churchill, University of Pennsylvania, Philadelphia, who discussed "Odds and Ends on Cattle Surgery"; and Robert L. Leighton, Springfield, who spoke on "Experiences with Intramedullary Pinning" (with illustrations).

Dr. Charles E. Streeter, Shelburne Falls, was admitted to membership in the Association.

s/C. LAWRENCE BLAKELY, *Secretary.*

Michigan

New Veterinary Medical Building at M.S.C.—Plans, already under construction at the Michigan State College veterinary medical center, call for a new structure connecting the anatomy building and the veterinary clinic, in addition to modernization of present buildings. Construction began in June, 1950, and is expected to be completed by late 1951.

The new building will make room for research and extension programs and will also be used for bacteriology and public health facilities. One of the objectives of the new center is to coördinate all phases of veterinary medicine and related sciences under one roof so that classroom work, research, and clinical procedures can be utilized together effectively. Although the new building will allow for substantial increase in the number of graduate and undergraduate students who can be given classroom and laboratory work in many fields not requiring clinical facilities (medical technology, bacteriology, physiology), it will not permit an increase in the number of students allowed to enter the School of Veterinary Medicine —64 each year.

A major addition to the veterinary hospital will be new x-ray equipment capable of photographing entire large animals, as well as making possible x-ray treatments. The new facilities will enable the School to provide top clinical training to all students of veterinary medicine.

The new veterinary medical center will be named "Giltner Hall" in honor of the late Dr. Ward Giltner, dean of the School of Veterinary Medicine from 1923 to 1948. Dean C. S. Bryan said, "Giltner Hall is proof of the lasting influence that the late Dean Giltner had on his colleagues. Giltner Hall will ever remain a tribute to this great man."

Minnesota

Clinic Building Dedicated.—The new clinic building of the division of veterinary medicine at the University of Minnesota was dedicated on Oct. 25, 1950. The great interest throughout the state in this new educational venture stimulated a large attendance, made up chiefly of veterinarians and livestock breeders.

Dr. W. A. Hagan, Dean of the New York State Veterinary college at Cornell University, Ithaca, N. Y., was the featured speaker at the dedication. His subject was "Veterinary Medical Education—Its Evolution and Its Present Status." Following the dedicatory program, "open house" was held in the new clinic building, where demonstrations of facilities were given and refeshments were served.

Missouri

Kansas City Association.—Information on

Architects drawing of proposed veterinary medical center at Michigan State College. The anatomy building (left) will be connected with the veterinary clinic (far right) when construction is completed late in 1951.

eperythrozoönosis, a recently observed quirk of swine practice, was presented at the September meeting by Dr. Earl J. Splitter of the Kansas State College faculty. President W. W. Wempe led the discussion. Doctors E. L. Montgomery of Belton and W. L. Conger of Ottawa, Kan., spoke on some current practice problems. Pursuant to custom, the Women's Auxiliary held its monthly meeting concurrently.

s/K. M. CURTS, *Secretary.*

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Dr. Ebert Appointed to Faculty of Veterinary School.—Dr. E. F. Ebert (COLO '31), Kansas City, was appointed professor of veterinary medicine and surgery in the School of Veterinary Medicine, University of Missouri, Columbia. Dr. Ebert will also serve as chairman of the Department of Veterinary Medicine and Surgery and director of veterinary clinics. A native of Colorado, Dr. Ebert practiced in Omaha, Neb., and Kansas City, Mo., before coming to the University.

Dr. Stanley Smith (NYC '92) Columbia, has also been added to the Department of Clinics as special lecturer and clinician.

s/A. H. GROTH, *Dean.*

Pennsylvania

State Association.—The sixty-eighth annual convention of the Pennsylvania State Veterinary Medical Association was held in Galen Hall, Wernersville, on Oct. 4-6, 1950. President R. S. Detwiler's opening address headed an interesting and instructive program.

Drs. T. M. DeVries, Altoona, and James V. McCahon, Downingtown; and poultrymen Roy Heckenluber, Biglersville, and H. J. Bicksler, Cleona, were members of a panel discussion on "Health Control Problems Confronting the Poultryman and the Veterinarian."

The following demonstrations followed the panel discussion: Dr. Claude Miller, BAI, Harrisburg, "Postmortem Demonstration on Poultry"; Dr. T. M. DeVries, "Practical Bleeding Demonstration in Poultry"; Dr. George T. Edds, Fort Dodge, Iowa, "BAL, Antidote for Arsenic and Other Metals".

Dr. F. J. Kingma, Department of Veterinary Pharmacology, The Ohio State University, Columbus: "Technique for the Slow Infusion of Fluids" and "Filariasis: Diagnosis and Treatment of Clinical Cases."

Dr. W. G. Magrane, Mishawaka, Ind.: "Basic Ophthalmology in the Dog" and "Advanced Ophthalmology in Small Animals."

Dr. John T. McGrath, University of Pennsylvania, School of Veterinary Medicine, Philadelphia: "Dyspituitarism in a Dog. Clinico-Pathological Observations" (with illustrations).

Dr. Mark Allam, University of Pennsylvania, School of Veterinary Medicine, Philadelphia: "The Practice of Modern Veterinary Surgery."

Dr. Arnold R. Gilman, research associate in virology, University of Pennsylvania, School of Veterinary Medicine: "Some Observations on the Nature of the Response of the Horse to the Virus of Equine Infectious Anemia."

Dr. E. W. Tucker, New York State Veterinary College, Kingston: "New York State Mastitis Control Program."

Dr. John D. Ray, Omaha, Neb.: "Swine Problems."

Dr. Kenneth McEntee, New York State Veterinary College, Ithaca: "The Pathology of Sterility in Dairy Cattle."

Dr. J. F. Knappenberger, Kansas City, Mo.: "Gastrointestinal Diseases of Cattle."

The operational value of two-way radio communications for the practicing veterinarian was demonstrated by the Frank B. Russell Co., Philadelphia.

Entertainment included a Pennsylvania Dutch dinner, square dance, hay ride in the mountains, and the annual banquet.

s/RAYMOND C. SNYDER, *Secretary.*

Tennessee

Short Course.—Sixty-one veterinarians registered for the annual short course at the University of Tennessee, Knoxville, on Aug. 7-8, 1950. Speakers, other than faculty members of the University, were Drs. Dennis Coughlin, BAI, Knoxville; M. G. Fincher, head, Department of Large Animal Medicine, New York State Veterinary College, Ithaca, N.Y.; Howard W. Hill, Maryville, Tenn.; F. E. Hull, head, Department of Animal Pathology, University of Kentucky, Lexington; C. E. Kord, state veterinarian, Nashville; S. H. McNutt, professor of veterinary science, University of Wisconsin, Madison; A. H. Quin, head, professional Service Division, Jensen Salsbery Laboratories, Kansas City, Mo.; W. J. Gibbons, Auburn, Ala.; and T. J. Young, Kingsport.

The interesting and instructive course, arranged by Dr. Dennis Sikes, University of Tennessee, included discussions on sterility and other problems of cattle practice, problems encountered in sheep practice, baby pig disease and atypical hog cholera, icterus in foals and internal parasites of horses, distemper in dogs, and control of mastitis, brucellosis, and leptospirosis. Progress reports were given on regional veterinary education and on recent advances in therapeutics in the field of biological and pharmaceutical products.

s/D. COUGHLIN, *Resident Secretary.*

Texas

Dr. Self Voted Oak Cliff's Man of the Month.—Dr. Richard A. Self (TEX '27), Oak Cliff, Dallas veterinarian and civic leader, has been named Oak Cliff's man of the month for August by editors of the magazine *Oak Cliff.* In addition to his practice, Dr. Self has for

many years been active in the Oak Cliff Lions Club, of which he is a charter member and a past president. As a director of the chamber of commerce, Dr. Self helped organize the diabetes-tuberculosis portable laboratory tests in Oak Cliff. Said Dr. Self, "When I first started practicing some twenty-three years ago, a veterinarian was still a 'horse doctor' and had but little chance to be recognized in society, and I am very proud today that in the past ten years we have made such rapid strides that today our veterinary profession is looked upon as an honored one."

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Dr. Smith Resident Consultant in Washington.—Dr. Hilton A. Smith (COLO '28), of the School of Veterinary Medicine, A. & M. College of Texas, recently spent two weeks in Washington, D.C., as resident consultant at the Armed Forces Institute of Pathology.

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Dr. Ruebke Joins Staff at A. & M.—Dr. Henry J. Ruebke (ISC'43) has joined the faculty of the School of Veterinary Medicine at the A. & M. College of Texas as an assistant professor in the Department of Bacteriology and Hygiene. He was engaged in privite practice in Ada, Minn., until 1947 when he joined the teaching staff at Iowa State College School of Veterinary Medicine where he taught veterinary anatmoy, bacteriology, and hygiene. He received his M.S. degree there in June, 1950.

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Guests at the Texas state dinner meeting at the Saxony hotel, held during the annual meeting of the AVMA in Miami Beach, included Dr. C. N. Barron, Stillwater, Okla. (center), and Dr. and Mrs. E. A. Grist, New Braunfels, Texas.

Wisconsin

Death of Banner Bill Morgan.—Dr. Banner Bill Morgan, Ph.D., Madison, died Sept. 7, 1950, of virus pneumonia. Though not a veterinarian, probably no man has worked harder for the profession. At the age of 35, one of the world's great protozoologists, his contributions in that field have been outstanding. A constant contributor to veterinary literature and a fluent speaker, he was in constant demand for veterinary meetings. Since 1939, Dr. Morgan had been associated with the Wisconsin College of Agriculture in various capacities.

s/R. CURTIS.

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Southeastern Association.—On September 7, the Southeastern Wisconsin Veterinary Medical Association met with the Dane County veterinarians at Madison. After reports by members in attendance at the Miami Beach Session of the AVMA, and preliminary plans for the 1951 meeting to be held in Milwaukee, Mr. W. D. Knox, editor of *Hoard's Dairyman* and secretary of the National Committee on Brucellosis spoke on "Why I am Interested in Disease Control."

s/ROBERT CURTIS, *Secretary.*

FOREIGN NEWS

Australia

Flying Veterinarians.—Government-employed veterinarians in the western part of New South Wales will henceforth have an aerial taxi service at their command for emergency calls in remote places. The Australian News and Information Bureau says a shortage of veterinarians, poor automobile roads, and a growing work-load fathered the new development. Scattered over the vast territory comprising the "western division" of New South Wales are 5½ million sheep, 45,000 cattle, and several thousands of other livestock. The project is being financed by a government levy of a few cents per head on cattle and a fraction of a cent on sheep.

Small planes, each with a private pilot, are being used. Landings are made on emergency airfields originally developed for private plane owners and flying physicians.

Austria

Rabies in Foxes.—Rabid foxes (Brit. *M. J.*, April 6, 1950) have made roads and lanes unsafe in northeastern and lower parts of the country. School children and motorcyclists have been chased by them. The source is thought to be rabid stray dogs and in turn the contact of strays with rabid foxes. A vigorous campaign against foxes has been organized by farmers and foresters, using guns, snares, and poisoned bait.

Formosa

Rinderpest.—The United Nations is struggling with an outbreak of rinderpest, with the aid of its Food and Agricultural Organization which keeps a stock of rinderpest vaccine in store at Hong Kong. The FAO has organized large-scale programs of vaccination against rinderpest in China and other countries. Dr. R. D. Reisinger

(API '43) appears to be a prominent figure in this work in the Orient.

Great Britain

International Congress on Radiology.—The Sixth International Congress on Radiology was held at Central Hall, Westminster, on July 24, 1950. It was attended by 2,700 members from 54 countries. There were symposiums on supervoltage radiotherapy, radiologic achievements, radiology of the chest, radiation hazards, radiodiagnosis, radiotherapy, radiobiology, and radiophysics. The next Congress will be held in 1953 in Copenhagen.

India

"Produce or Perish."—The declared and widely aired "Produce or Perish" program of the new government is taking form in the poultry- and horse-breeding industries. Model poultry farms are being established under public supervision to amplify an industry formerly left entirely in the hands of poor and illiterate families. Horse breeding is envisaged to supersede bullock power during the long stretch of time that will be required to build roads suitable for swifter transportation. On the Indo-Burmese terrain, the success of the Burmese campaign in the last war could not have been achieved without cavalry and horse transport. Misconceptions about the horse and mechanical transportation make the revival of horse breeding "bristle with difficulties."—*From the Indian Vet. J., January,* 1950.

Japan

Veterinary Education.—The Education Committee of the Japan Veterinary Medical Association has adopted a resolution for submission to the Ministry of Education recommending increase of veterinary collegiate requirements from four to five years. This action is in accord with suggestions of the Public Health and Welfare Section.

In 1950, there were 935 graduates from the 15 veterinary colleges in Japan.

VETERINARY MILITARY SERVICE

Food Industry and the Veterinary Corps.—"The mission of procuring, handling, and distributing subsistence for the Armed Forces is one of considerable magnitude, involving the efforts of many people and interests within and without the military establishment to get subsistence to the ultimate consumer—the soldier." Brigadier General J. A. McCallam, chief of the Veterinary Division, Army Surgeon General's Office, made this statement to the graduating class of the Quartermaster Corps Subsistence School in Chicago recently.

General McCallam concluded his remarks to the graduating officers by saying that the successful accomplishments in the field of food supply during World War II were due to the fact that all concerned pulled on the traces as a team. He expressed confidence that the same organizations will again meet the challenge successfully.

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Major Sasmore to Conduct Research on In-Flight Feeding.—Major Dan P. Sasmore, has been assigned to the Department of Global Preventive Medicine at the Air Force School of Aviation Medicine, Randolph Field, Texas. Major Sasmore came to the aeromedical school from the Fourth Medical Laboratory at Heidelberg, Germany, where he was engaged in research work. He will serve as an instructor in food inspection, environmental sanitation, and transmissible diseases while conducting research in the field of in-flight feeding.

Major Dan P. Sasmore

Major Sasmore and his family reside in Schertz, near Randolph.

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Changes in Assignment, Veterinary Division of the Air Force.—The following officers have been called to active service: Lt. Robert Louis Brown, Staunton, Va., to Langley Air Force Base; Lt. Clarence A. Delli Quadri, Pueblo, Colo., to Offutt Air Force Base; Lt. William R. Bilderbeck, Fort Worth, Texas, to Andrews Air Force Base; Lt. Jack D. Douglas, Bay City, Ore., to Walker Air Force Base; Lt. Wilman W. Ivy, Whiteland, Texas, to Edwards Air Force Base. Major Robert K. Nelson has been relieved

from duty at Langley Air Force Base and will be reassigned to the Ramey Base.

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Personals, Veterinary Division of the Air Force.—Col. James C. Barta has been reassigned from Veterinary Division, Office of the Surgeon General, to MacDill Air Force Base. . . . Major Frederick Weil has been assigned to Mather Air Force Base. Major Weil has recently returned to the Z/I from Okinawa, where he was on duty with the Army. . . . Capt. William A. Rader has been reassigned from duty with the U.S. Army at Percy Jones General Hospital to Rapid City Air Force Base. . . .Major James C. McIntyre has been reassigned from Scott Air Force Base to the Francis E. Warren base. . . .Capt. Carl E. Wendell has returned from an overseas assignment at Tripoli and will be assigned to Chanute Air Force Base. . . .Major Daniel P. Sasmore has reported from duty with the U.S. Army, European Command, to the School of Aviation Medicine, Randolph base, as an instructor. . . . Major W. B. Snodgrass, Rapid City Air Force Base, attended the veterinary section of the British-American Military Medical Conference in Montreal, July 19-26. . . .Col. Wayne O. Kester accompanied the Surgeon General on a tour of several southern and western Air Force bases in late June. He also attended sessions of the American Medical Association in San Francisco and the California State Veterinary Medical Association meeting in Berkeley. . . .Major Robert R. Miller accompanied an inspection group to Sewart, Carswell, Williams, Nellis, Kelly, and Brookley Air Force bases, June 8-15. . . .Lt. Col. Willard M. Van Sant attended the Conference of Public Health Veterinarians at Montgomery, Ala., and Atlanta and Savannah, Ga., August 11-18.

BIRTHS

Dr. (ISC '34), and Mrs. L. Proctor, Oelwein, Iowa, announce the birth of a son, Jon Bob, on July 4, 1950.

Dr. (ISC '40), and Mrs. F. E. Brutsman, Traer, Iowa, announce the birth of a son, Bruce Allen, on Aug. 7, 1950.

DEATHS

★**F. H. Barr** (CVC '92), 82, Albuquerque, N. M., died May 2, 1950, after a long illness. Dr. Barr was a member of the AVMA for forty-six years.

★**William R. DeMoss** (API '47), 42, Campbellsville, Ky., died Sept. 7, 1950. Dr. DeMoss was a member of the Kentucky Veterinary Medical Association and of the AVMA. He is survived by his wife and one daughter.

★Indicates members of the AVMA.

Edward Fisher (ISC '21), 60, Orange City, Iowa, died on May 4, 1950, of a heart attack. For several years, Dr. Fisher was associated in practice with Dr. H. J. Van de Waa, who died in 1949.

★**John B. Hopper** (AMER '92), 78, Ridgewood, N. J., died of a heart attack on July 27, 1950. One of the outstanding civic leaders of Ridgewood, Dr. Hopper was elected to the village commission in 1914 and again in 1918, at which time he was also named mayor. He resigned at the end of the term and was reelected mayor again in 1926. In 1930, he retired from the commission.

Dr. Hopper was the first president of the Ridgewood Board of Health and served nine years on the Board of Education. He was a charter member of the Volunteer Firemen's Association, the Ridgewood Lions Club, Ridgewood Elks, and was a thirty-second degree mason. He was a past president of the Veterinary Medical Association of New Jersey and continued active in its affairs until the time of his death.

A trotting enthusiast, for many years he drove his sulky in races in New York and at the former track in Hohokus.

Dr. Hopper, whose father was a veterinarian, as is one son and a grandson, was admitted to the AVMA in 1892 and was made an honor roll member of the Association in 1942. He is survived by his wife, Mrs. Anna Van Emburgh Hopper; two sons, Earle B. (COR '17), of Ridgewood, and Bernard E., of Winnetka, Ill.; five grandchildren and five great-grandchildren.

★**G. N. Miller** (SF '15), 65, Covina, Calif., died June 14, 1950. Dr. Miller was a member of the Southern California and California State veterinary medical associations and of the AVMA.

★**W. R. Smith** (OSU '12), 66, Las Vegas, Nev., died June 12, 1950, of a heart attack. Dr. Smith started general practice at Las Vegas in 1935 and later became a full-time member of the Clark County Health Department in charge of meat and milk inspection. Since 1947, he has served as representative of the State Department of Agriculture in animal desease-control work on a part-time basis. Dr. Smith was admitted to the AVMA in 1937.

★**R. C. Sutherland** (TH '12), 68, El Centro, Calif., died Aug. 10, 1950. Dr. Sutherland had been field veterinarian for the California State Department of Agriculture, Division of Animal Industry, since 1940. He was a member of the AVMA.

★**Charles N. Wells** (OSU '12), 73, Kirkersville, Ohio, died May 11, 1950, of a heart attack. Dr. Wells was a veteran of the Spanish-American War and of World War I. He was admitted to the AVMA in 1920.

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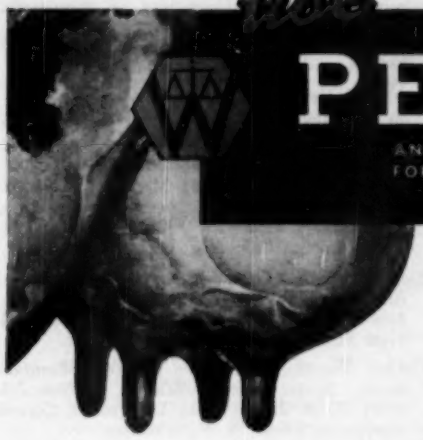

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An' Related Topics

WATCH YOUR ENGLISH AND OURS

Plurals

There would be neither enough space nor much common sense, in this place, to write an essay on the way to form plurals in the English language. The purpose of this chapter is to point out some of the errors commonly made in forming the plurals of technical terms and of a few in the general vocabulary. And no wonder! The myriad ways of forming plurals in our language is one of the reasons why English is reputed to be more difficult to learn than any of the modern languages. Ambiguous rules and many exceptions make it difficult to come up with the right form when determining plurals. The plural endings of *s* and *es* in modern English are interspersed with a variety of plural endings, besides the long list of foreign medical and anatomic words which we have accepted, both singular and plural. Among the latter are:

alveoli	humeri	Protozoa
apparatus	maxima	rami
bacteria	nidi	spermatozoa
bronchi	nuclei	uteri
criteria	papillae	vertebrae
data	phenomena	verucae
desiderata	pleurae	viscera
emboli	polypi	

The English language contains many separate and distinct styles of forming plurals, and the following list, representing several different kinds of plurals, gives a view of the whole difficult question.

Plural	*Singular*
beaux	beau
calves	calf
children	child
churches	church
crises	crisis
cries	cry
feet	foot
foci	focus
foramina	foramen
geese	goose
indexes	index
ladies	lady

(Continued on p. 26)

COMING MEETINGS

Notices of Coming Meetings must be received by 4th of month preceding date of issue

Minnesota, Conference for Veterinarians. Annual conference. University of Minnesota, School of Veterinary Medicine, St. Paul 1, Minn., Oct. 25-26, 1950. W. L. Boyd, 2227 Hillside Ave., St. Paul 8, Minn., chairman.

Interstate Veterinary Medical Association. Annual meeting. Martin Hotel, Sioux City, Iowa, Nov. 1-2, 1950. H. C. Smith, 2415 W. Solway, Sioux City, Iowa, secretary.

Mississippi Valley Veterinary Medical Association. Fall meeting. Pere Marquette Hotel, Peoria, Ill., Nov. 1-2, 1950. R. J. Kirkpatrick, 1235 N. Henderson St., Galesburg, Ill., secretary.

United States Livestock Sanitary Association. Annual meeting. Westward-Ho Hotel, Phoenix, Ariz., Nov. 1-3, 1950. Dr. R. A. Hendershott, 1 West State St., Trenton, N.J., secretary.

Cornell Nutrition Conference for Feed Manufacturers. Statler Hotel, Buffalo, N. Y., Nov. 2-3, 1950. F. W. Hill, Poultry Department, Cornell University, Ithaca, N. Y., chairman.

Southern Veterinary Medical Association. Annual meeting. Baker Hotel, Dallas, Texas, Nov. 6-8, 1950. A. A. Husman, 320 Agricultural Bldg., Raleigh, N. Car., secretary.

Texas, State Veterinary Medical Association of. Annual winter meeting will be held in conjunction with the Southern Veterinary Medical Association. Baker Hotel, Dallas, Texas, Nov. 6-8, 1950. Leon G. Cloud, 2833 W. Seventh St., Fort Worth 7, Texas, resident secretary.

Third Inter-American Congress on Brucellosis, The. Washington, D.C., Nov. 6-10, 1950. Wesley W. Spink, University of Minnesota Medical School, chairman.

Association of Military Surgeons. Annual Convention. Hotel Statler, New York City, Nov. 9-11, 1950. (A veterinary medical panel will be presented Friday afternoon, November 10.) Brig. General J. A. McCallam, V.C., Department of the Army, Office of the Surgeon General, Washington 25, D.C.

Association of Land-Grant Colleges and Universities, Division of Veterinary Medicine. Hotel Statler, Washington, D.C., Nov. 13-15, 1950. C. S. Bryan, Michigan State College, East Lansing, Mich., member of Executive Committee.

(Continued on p. 50)

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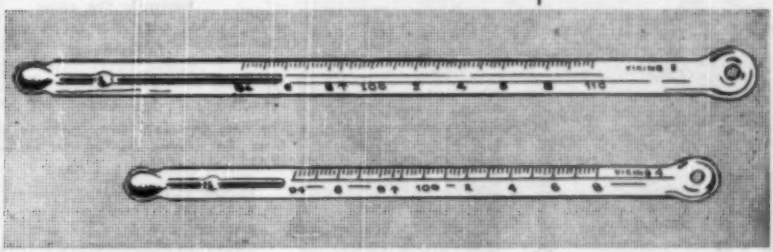

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(WATCH YOUR ENGLISH — *continued from p. 24*)

lice	louse
literati	literatus
men	man
oxen	ox
Protozoa	protozoon
turkeys	turkey
umbilici	umbilicus
women	woman
zebras	zebra

Omitted are the compound words which take the plural at the first element, namely: knights-templar, courts-martial, mothers-in-law, etc. This quirk seldom tricks the veterinary author but is, nevertheless, one to bear in mind. There is also to consider words that are both singular and plural: deer, sheep, fish, elk, grouse, moose, to mention but six out of many: One writes:

1 deer or 20 deer
1 sheep or 20 sheep
1 moose or 20 moose
1 elk or 20 elk

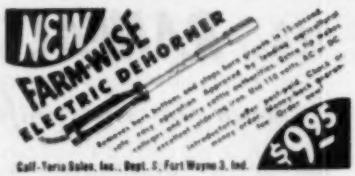
In the case of swine and cattle, since it would be awkward to write *a swine* and *a cattle*, we dodge the issue by referring to these groupings as so many head, as in:

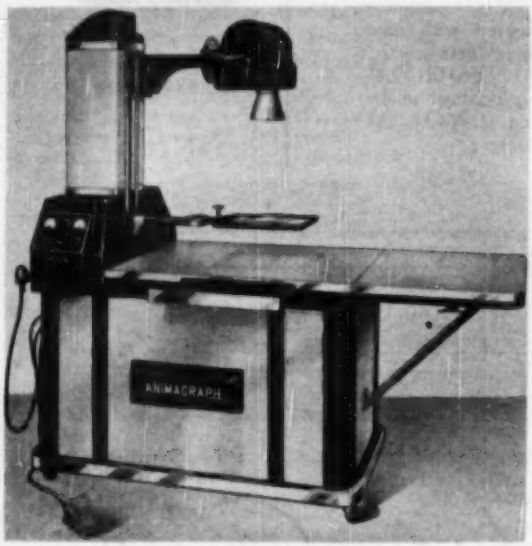
20 head of hogs
1 head of cattle

in which case, *head* becomes both a singular and plural noun. *Head* in this sense is uniquely of farm-animal origin.

The object of this seemingly lengthy prelude to the subject of plurals is intended (1) to prove the complexity of the subject and (2) to cultivate acquaintance with the names of groups of organisms, from the elephant to the microbe, which are not too well pluralized in veterinary writings.

(To be continued)





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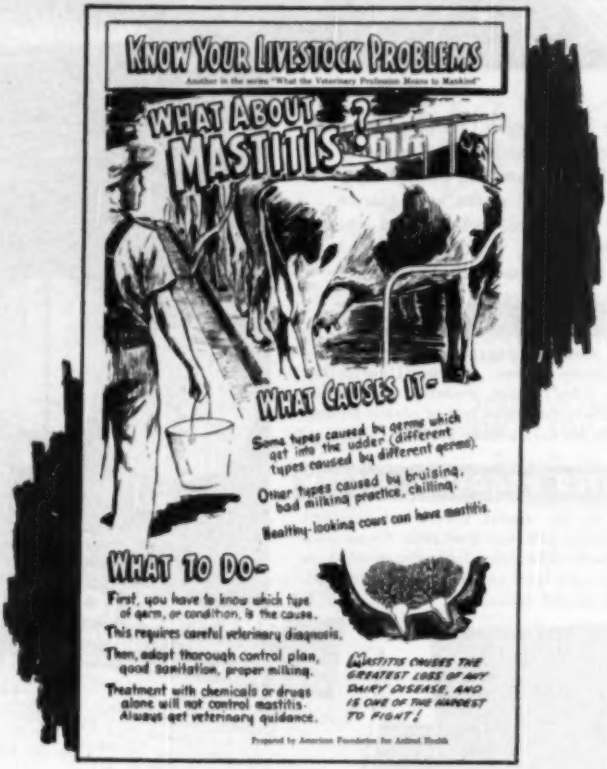
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(COMING MEETINGS — *continued from p. 24*)

Midwest Small Animal Association. Annual meeting. Hotel Burlington, Burlington, Iowa, Nov. 15, 1950. J. Porter Coble, 2828 S. MacArthur Blvd., Springfield, Ill., secretary.

American College of Veterinary Pathologists. Seminars on teaching methods for veterinary pathology and on histopathology. Nov. 24-25, 1950 (location to be announced later). Major T. Carl Jones, Casual Off. Co., Personnel Center, Fort Dix, N.J.

American Society of Animal Production. Annual meeting. Hotel Sherman, Chicago, Ill., Nov. 24-25, 1950. H. M. Briggs, Oklahoma A. & M. College, Stillwater, Okla., secretary.

Nebraska State Veterinary Medical Association. Annual meeting. Hotel Cornhusker, Lincoln, Neb., Dec. 5-7, 1950. Ordella Geisler, 919 L Street, Lincoln, Neb., secretary.

Maryland State Veterinary Medical Association. Winter meeting. Emmerson Hotel, Baltimore, Md., Dec. 7-8, 1950. John D. Gadd, Towson 4, Md., secretary.

American Association for the Advancement of Science. Annual meeting. Cleveland, Ohio, Dec. 26-30, 1950. Raymond L. Taylor, 1515 Massachusetts Ave., N. W. Washington 5, D. C., assist. admin. secretary.

New York State Veterinary College. Annual conference for veterinarians. Cornell University, Ithaca, N. Y., Jan. 3-5, 1951. W. A. Hagan, dean.

Ohio State Veterinary Medical Association. Annual meeting. Deshler-Wallick Hotel, Columbus, Ohio, Jan. 3-5, 1951. Fred J. Kingma, 121 E. Weber Rd., Columbus 2, Ohio, secretary.

Oklahoma Veterinary Medical Association. Annual meeting. Skirvin Hotel, Oklahoma City,

(*Continued on p. 32*)

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(COMING MEETINGS — *continued from p. 30*)

Okla., Jan. 8-9, 1951. Lewis H. Moe, 1736 W. 3rd Ave., Stillwater, Okla., secretary.

Indiana Veterinary Medical Association. Annual meeting. Hotel Severin, Indianapolis, Ind., Jan. 10-12, 1951. W. W. Garverick, Zionsville, Ind., secretary.

Tennessee Veterinary Medical Association. Annual meeting. Maxwell House Hotel, Nashville, Tenn., Jan. 15-16, 1951. H. W. Nance, 417 N. Military St., Lawrenceburg, Tenn., secretary.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Des Moines, Iowa, Jan. 17-19, 1951. F. B. Young, P.O. Box 6, Waukee, Iowa, secretary.

Intermountain Veterinary Medical Association. Annual meeting. Newhouse Hotel, Salt Lake City, Utah, Jan. 18-20, 1951. M. L. Miner, Logan, Utah, secretary.

Mississippi Veterinary Medical Association. Annual meeting. Edwards Hotel, Jackson, Miss., Jan. 19-20, 1951. John A. Randle, West Point, Miss., secretary.

California State Veterinary Medical Association. Annual mid-winter conference. University of California's School of Veterinary Medicine, Davis, Calif., Jan. 22-24, 1951. Mr. Charles S. Travers, 3004 16th St., room 208, San Francisco, Calif., secretary.

Louisiana Veterinary Medical Association. Annual conference. Louisiana State University, Baton Rouge, La., Jan. 23-24, 1951. R. B. Lank, Louisiana State University, Baton Rouge 3, La., secretary.

North Carolina State College of Agriculture and Engineering of the University of North Carolina. Annual conference for veterinarians. Jan. 23-26, 1951. C. D. Grinnells, chairman, North Carolina Veterinary Conference, Raleigh, N. Car.

Michigan State College. Annual postgraduate conference for veterinarians. School of Veterinary Medicine, Michigan State College, East Lansing, Mich., Jan. 24-25, 1951. C. S. Bryan, dean.

Illinois State Veterinary Medical Association. Annual meeting. Hotel Sherman, Chicago, Ill., Jan. 25-27, 1951. A. G. Misener, 6448 North Clark St., Chicago 26, Ill., secretary.

Virginia State Veterinary Medical Association, Winter meeting. Hotel Roanoke, Roanoke, Va., Jan. 29-31, 1951. Harry K. Royer, 1404 Main Street, Lynchburg, Va., secretary.

Minnesota State Veterinary Medical Society. Annual meeting. Hotel Nicollet, Minneapolis, Minn., Jan. 31-Feb. 2, 1951. B. S. Pomeroy, School

(*Continued on p. 34*)

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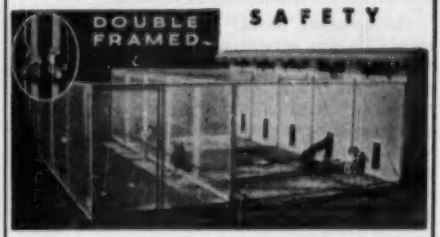

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(COMING MEETINGS — *continued from p. 32*)

of Veterinary Medicine, University of Minnesota, St. Paul 1, Minn., secretary.

New Jersey, The Veterinary Medical Association of. Annual meeting. Hotel Hildebrecht, Trenton, N.J., Feb. 8-9, 1951. J. R. Porteus, P.O. Box 938, Trenton, N.J., secretary.

American Animal Hospital Association. Annual meeting. Chalfonte-Haddon Hall, Atlantic City, N.J., May 2-5, 1951. Wayne Riser, 5335 Touhy Ave., Skokie, Ill., secretary.

North Carolina State Veterinary Medical Association. Annual meeting. Hendersonville, N. Car., June 8-9, 1951. J. H. Brown, Tarboro, N. Car., secretary.

American Veterinary Medical Association. Annual meeting. Milwaukee Auditorium, Milwaukee, Wis., Aug. 20-23, 1951. J. G. Hardenbergh, American Veterinary Medical Association, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Regularly Scheduled Meetings

Bay Counties Veterinary Medical Association, the second Tuesday of each month. Russell P. Cope, 1205 San Pablo Ave., Berkeley 6, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Thomas Eville, Route 1, Box 136H, Fresno, Calif., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. O. A. Soave, 5666 Telegraph, Oakland, Calif., secretary.

Fayette County Veterinary Association, Iowa, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Greater St. Louis Veterinary Medical Association. Ralston-Purina Research Building, St. Louis, Mo., the first Friday in February, April, June, and November. W. C. Schofield, Dept. of Animal Pathology, Ralston-Purina Co., St. Louis 2, Mo., secretary.

(*Continued on p. 36*)

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(COMING MEETINGS — *continued from p. 34*)

Houston Veterinary Medical Association, Houston, Texas, the first Thursday of each month. Edward Lepon, Houston, Texas, secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Wednesday of even-numbered months. R. A. Case, 400 S. Garden St., Peoria, Ill., secretary.

Indiana Tenth District Veterinary Medical Association, third Thursday of each month. L. A. Snider, New Palestine, Ind, secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month, in Louisville or within a radius of 50 miles. F. M. Kearns, 3622 Frankfort Ave., Louisville 7, Ky., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month, in the Hotel Continental, 11th and Baltimore, Kansas City, Mo. K. M. Curts, 70 Central Ave., Kansas City 18, Kan., secretary.

Keystone Veterinary Medical Association, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., the fourth Wednesday of each month, October through May. Leonard Krawitz, 5300 Lancaster Ave., Philadelphia 31, Pa., secretary.

(COMING MEETINGS — *continued*)

Maricopa County Veterinary Association, the second Tuesday of each month. Charles J. Prchal, 1722 East Almeria Road, Phoenix, Ariz., secretary.

Massachusetts Veterinary Association, Hotel Statler, Boston, Mass., the fourth Wednesday of each month. C. L. Blakely, Angell Memorial Animal Hospital, 180 Longwood Ave., Boston, Mass., secretary-treasurer.

Michiana Veterinary Medical Association, the second Thursday of each month. Write R. W. Worley, secretary, 3224 L.W.W., South Bend, Ind., for location.

Michigan, Southeastern Veterinary Medical Society. Herman Kiefer Hospital, Detroit, Mich., the second Wednesday of each month from October through May.

Milwaukee Veterinary Medical Association. Wisconsin Humane Society, 4150 N. Humbolt Ave., Milwaukee, Wis., the third Tuesday of each month. Kenneth G. Nicholson, 2161 N. Farwell Ave., Milwaukee, Wis., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. C. Edward Taylor, 2146 South Broad St., San Luis Obispo, Calif., secretary.

New York City Veterinary Medical Association. Hotel Statler, New York, N. Y., the first Wednesday of each month. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. V. E. Graff, Oakdale, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. James R. Ketchersid, 666 East Highland Avenue, San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, bimonthly, the second Tuesday of each month. J. H. Bower, P. O. Box 355, Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. E. W. Paul, Box 866, Redwood City, Calif., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. John E. Wion, 3164 Redwood Highway South, Santa Rosa, Calif.

Sacramento Valley Veterinary Medical Association, the fourth Friday of each month. R. C. Goulding, 11511 Capitol Avenue, Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. R. J. McFarland, 3621 Jewell St., San Diego 9, Calif., secretary.

Southern California Veterinary Medical Association, the third Wednesday of each month. D. H. McDole, 8674 Melrose Ave., Los Angeles 46, secretary.

(*Continued on p. 38*)

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Carbohydrate	(gms.)	42.5	45.7
Fat	(gms.)	54.2	14.7
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Calcium	(gms.)	0.05	2.0
Phosphorus	(gms.)	0.38	1.59
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Thiamine	(mgs.)	0.38	1.41
Riboflavin	(mgs.)	0.43	1.86
Niacin	(mgs.)	8.71	18.2
Energy:		Lamb chop dinner: 23.4% of daily caloric needs for average man	
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Member Associated Serum Producers, Inc.

(COMING MEETINGS — *continued from p. 36*)

South Florida Veterinary Society, the third Tuesday of each month, 8:00 p.m., at the Peckway Skeet Club, Robert P. Knowles, 2936 N.W. 17th Ave., Miami, Fla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month, 8:00 p.m., at the Tulsa Hotel. R. S. Todd, 1222 S. Lewis, Tulsa, Okla., secretary.

Foreign Meetings

First Pan-American Veterinary Conference. Lima, Peru, May 20-26 (tentative), 1951. José Santivañez, dean, Veterinary College, San Marcos University, Lima, Peru.

To merely report passing events without editorial analysis or suggestive comment is a failing of present day veterinary journals. By cutting patterns from the literature of the nineteenth century, the gap could be filled.

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Wanted—Veterinarians

Veterinarians wanted immediately for work with small animals on staff of animal hospital in New York City. Positions permanent. Applicants must have or be able to obtain New York license. Address "Box A 3," c/o JOURNAL of the AVMA.

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WANTED—small animal assistant, to work in established hospital in Washington, D.C. area. Good salary, also hospital apartment if desired. Please include references and photo in first letter. Address "Box A 19," c/o JOURNAL of the AVMA.

Assistant veterinarian wanted for small animal hospital. Denver, Colo. Address "Box A 13," c/o JOURNAL of the AVMA.

WANTED—veterinarian for small animal practice, Ohio city. Must be capable of assuming full charge if necessary. Write only if interested in permanent position. Give experience, age, army status, references, and photo. Address Dr. Robert W. Sass, 1525 Broadway, Toledo, Ohio.

Michigan Humane Society desires graduate veterinarian in new, small animal outpatient clinic. Michigan license, or ability to obtain, necessary. Beginning salary $3,600; men or women considered. Address Michigan Humane Society, 7401 Richmond Ave., Detroit 11, Mich.

(Continued on p. 42)

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(CLASSIFIED ADS — *continued from p. 40*)

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WANTED—to purchase small animal practice by experienced and financially responsible veterinarian. With home if available. Practice must be going and lucrative, otherwise do not reply. Send photo or sketches. Address "Box A 9," c/o JOURNAL of the AVMA.

Wanted—Positions

POSITION WANTED—graduate of AVMA-approved school, small animal experience, desires position in small animal practice in metropolitan New York area or nearby. Address "Box A 1," c/o JOURNAL of the AVMA.

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POSITION WANTED—by 1949 graduate of AVMA-approved school as assistant in large animal or mixed practice in Florida. Address "Box A 16," c/o JOURNAL of the AVMA.

WANTED POSITION—student, graduating May, 1951, desires position as assistant in mixed practice in north central states. Can arrange interview during Christmas vacation, 1950. Address "Box A 10," c/o JOURNAL of the AVMA.

Graduate of AVMA-approved school, single, 29, two years' experience, requires post. West or Midwest preferred. Address "Box A 8," c/o JOURNAL of the AVMA.

Pennsylvania graduate, small and large animal experience, desires responsible assistantship on percentage basis or lease of practice. Please give approximate earning capacity in first reply. Address "Box A 17," c/o JOURNAL of the AVMA.

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(*Continued on p. 44*)

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(CLASSIFIED ADS — *continued from p. 42*)

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FOR SALE—growing large animal practice in midwestern city of 5,000. 10 per cent small animal. No real estate. Owner preparing to leave for military duty. Priced reasonable for quick sale. Address "Box A 18," c/o JOURNAL of the AVMA.

(*Continued on p. 46*)

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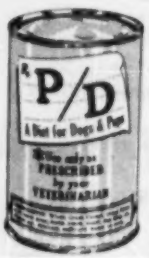

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(CLASSIFIED ADS — *continued from p. 44*)

Miscellaneous

An Open Letter to All Veterinarians

This is an appeal to some particular veterinarian who may be called upon in the near future to treat our dog. Please keep reading and I will explain.

Our family dog "Snuf" has been lost since September 12 and, although we have advertised through newspapers and the radio, we have found no trace of her. Someone may have picked her up. If so, her present "owners" may need the services of a veterinarian in the next few weeks or months. She is an unspayed Collie, 9 years old, and in the past has been unable to have pups naturally. She has had one cesarean section, the pups being dead when delivered, and the last litter, born in late spring, although we were able to deliver them naturally, were also dead. If she becomes pregnant again, this will undoubtedly recur.

Her description is: tan Collie with white face, chest, collar, feet, tip of tail, and around base of tail. Her right ear will not stand up straight, the tip of her right front canine tooth is broken off, and she has a small hernia the size of two fingers on the midline near the umbilicus.

We will be deeply grateful if anyone seeing this dog, though it should be months or a year from now, will phone us collect—Frederick, Md. 2131. Donald R. Lynch, D.V.M., R.F.D. No. 1, Frederick, Md.

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Stang-Wirth's "Tierheilkunde und Tierzucht." Last edition, 1937. (Plates destroyed during war.) Twelve volumes perfect condition. $100. For sale until November 15 only. Address "Box A 2," c/o JOURNAL of the AVMA.

FOR SALE—Shetland Sheepdogs, sired by son of Champion Golconda, males and females, sable and white, six weeks to six months. Dr. V. Martinson, Granville, Wis.

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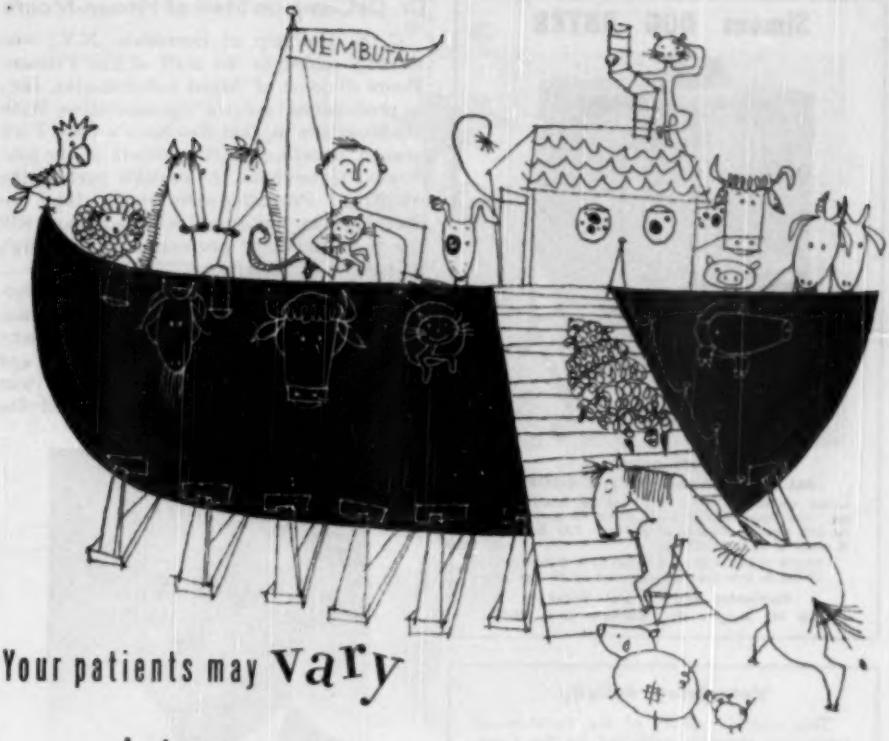

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Dr. DeCamp on Staff of Pitman-Moore

C. E. DeCamp of Scarsdale, N.Y., was recently added to the staff of the Pitman-Moore division of Allied Laboratories, Inc., as professional service representative. With headquarters at that Company's New York branch, he will contact members of the profession throughout the eastern part of the country. Pitman-Moore states that cooperation in building increased good will for the veterinary profession will be high on his list of activities.

For years, Dr. DeCamp operated a successful small animal practice at Scarsdale, N.Y., having sold it to Dr. A. A. Appleby early in 1950. Active in local, state, and national veterinary associations, he was chairman of the public relations and the

Dr. C. E. DeCamp

small animal practice committees of the New York State Veterinary Medical Society; has directed programs and been president of the Veterinary Medical Association of New York City; and has been active on the Public Relations Committee of the AVMA. He has served on the Council of the New York State Veterinary College and on numerous committees of the American Animal Hospital Association. His contributions to veterinary literature have been many.

In addition to these professional activities, he served as president of the Scarsdale Rotary Club; is a member of the American Legion, the Masons, and the Scarsdale Baptist Church.

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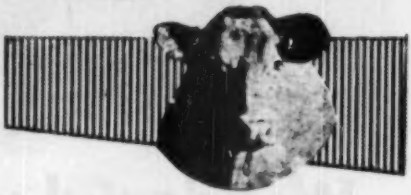

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